

## **COLLABORATIVE CIRCULAR ECONOMY NETWORK**

**Scoping Study**

**Final Report  
(Desensitised)**

March 2017

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Appendix 1: Reprocessor Recyclate Quality Specification Benchmarks

## Executive Summary

The economic, environmental and social benefits of moving to a Circular Economy are widely accepted. In line with global trends, momentum has been building in Northern Ireland to ensure that the circular economy is firmly embedded in the next Programme for Government, and local authorities have been identified as having a central role to play in this transition.

It is expected that, if Northern Ireland is to achieve its current and future recycling targets and move to a circular economy, local authorities will have to adopt new approaches to waste management and household waste collections. Indeed, a strategic ‘Task and Finish’ group set up by government has concluded that, if the current approach to waste management is not changed, it is highly likely that the economic potential from a circular economy will not be realised, opportunities to develop new products from waste will be lost, the cost of waste management treatment will continue to increase and local authorities will be exposed to continuing risks from illegal waste activity.

This same ‘Task and Finish’ Group has recommended that, to effectively support a more circular economy approach, there needs to be greater collaboration between councils, reprocessors and the waste management supply chain. To this end, in 2016, a network of ten public and private sector organisations came together to explore ways by which more value could be recovered from household waste collected in Northern Ireland.

The network included a number of reprocessors of plastics, glass and paper recyclate and food waste, offering high value recycling outlets for locally collected waste, and a number of local authorities representing a potential source of recyclate for the local economy:

Cherry Plastics Group (plastics reprocessor)	Antrim and Newtownabbey Borough Council
Encirc Ltd (glass cullet reprocessor)	Armagh City, Banbridge and Craigavon Borough Council
Huhtamaki Lurgan Ltd (paper reprocessor)	Belfast City Council
AgriAD (food waste reprocessor)	Lisburn and Castlereagh City Council
Bryson Recycling (recycling services provider)	Mid and East Antrim Borough Council

*(DAERA and WRAP had an observational role in the Network)*

A scoping study was carried out, to outline the needs of the reprocessors in the Network, the extent to which their recyclate needs are currently met from within Northern Ireland, and the economic and commercial impact that an increased and

higher quality local recyclate supply could have on the reprocessors and on the local economy.

The scoping study concluded that ***there is a strong strategic, economic and environmental opportunity to improve the quality and quantity of recyclate collected from households within Northern Ireland, through new approaches to household waste collections:***

- There is a clear demand and need from the local reprocessors for more recyclate to be supplied from household collections in Northern Ireland.
- However, much of the recyclate currently collected from households in Northern Ireland does not meet the quality standards required by the reprocessors and is being exported to lower value markets outside Northern Ireland, meaning that some of the value inherent in the recyclate is lost to the Northern Ireland economy and the growth potential from our reprocessing sector is being inhibited.

Quality is critical to each of the reprocessors in the network, but they have been unable to source adequate supplies locally at the required quality levels. As a result, they are having to import their recyclate rather than sourcing it locally.

Indeed, the lack of locally available recyclate is placing the local reprocessors at a disadvantage in terms of costs, efficiencies and capacity to grow. If more recyclate was available from within Northern Ireland at the required quality levels, it would not only strengthen the reprocessors' businesses in terms of efficiencies and cost savings, and safeguard the 700+ jobs currently employed, but would also reduce their carbon impact and enable the reprocessors to implement further plans for expansion and job creation.

- To achieve the quality standards at the volumes required will necessitate a change to the current household waste collection systems, so as to reduce contamination by the introduction of a separately collected approach to recycling, using containers such as wheelie boxes or similar container.

Each of the reprocessors reported that, from their experience, co-mingled collection systems result in unacceptable levels of contamination, whereas recyclate that has been collected separately through kerb-side sort, separate 'bring' sites and Community Recycling Centre's meets their quality specification.

- Recyclate that is collected using methods that do not deliver the quality levels required by these reprocessors generally go to lower value applications. This is a lost opportunity for the Northern Ireland economy, in terms of both the value

recovered from our waste and supporting the growth and competitiveness of this valuable reprocessing sector.

- The Scoping Study estimates that the **current** economic value of the 3 materials reprocessors in the Network is at least **£110mn**, with a **further c£50mn of unrealised economic potential** from the additional capacity that the reprocessors could release if additional recycle was available locally. These estimates do not include the value that could also be derived from generating biogas from food waste.
- Household food waste is currently an under-recovered and under-exploited resource. Not only are the recycling capture rates low, but the food waste that is collected mainly goes for composting, which is a relatively low value outlet in comparison with applications such as anaerobic digestion.

If more food waste was collected and available for applications such as anaerobic digestion, it would help to support the realisation of the bioenergy potential within Northern Ireland, reduce the need for energy crops, reduce reliance on fossil fuels and increase renewable energy generation and have a net positive environmental and carbon impact.

- Coupled with the need and demand from the reprocessing sector, local authorities are also facing targets to increase recycling rates and reduce levels of residual waste. It has been recognised that these pressures will also require a change to waste management systems. Indeed, many local authorities are already actively considering options to introduce new and less fragmented approaches to waste management, to increase recycling rates and deliver a higher quality recycle.
- Finally, central government is recognising the importance of transitioning towards a more circular economy and that waste management has a key role to play in this evolution. As the circular economy becomes more and more embedded into government policy, waste management and collection systems will have to be designed in a way to ensure that the value from recycle is optimised within the local economy.

It is also concluded that, to put in place the necessary waste collection systems and ensure that the circular economy opportunity is fully realised, **the waste management supply chain will need to work collaboratively** to develop systems which are practical and workable for the various players in the supply chain. This collaboration could take the form of sharing information on respective needs, developing solutions through collaborative planning and discussion and collaborative contracting. There is potential for significant benefit from councils working collaboratively to help to develop consistent approaches to delivery and public

communications, including economies of scale, collective access to supply chains and sales of recyclate.

Indeed, the collaboration and sharing of information that has resulted from the Scoping Study exercise is already helping to progress this issue, with the information provided by the reprocessors and on the economic impact helping Councils develop their plans and helping to inform government on the economic opportunity.

By developing household collection systems which will improve the quality of recyclate to meet local reprocessor requirements and increase the volumes of recyclate, there is potential to:

- not only **protect jobs**, but also create an environment for **expansion and job creation** within the reprocessing sector.
- build **resilience** into the Northern Ireland economy, and support the transition to a **circular economy**.
- increase **recycling rates**, reduce waste disposal and deliver **carbon savings** for Northern Ireland.

The work of this collaborative network therefore has the potential to make a strong contribution to the movement to a circular economy. However, this will require a change to current waste management systems, connecting the needs of recyclate reprocessors, in terms of the quality and quantity of household collected waste, with the needs of the local authorities, in putting in place collection systems which meet their waste and recycling targets and are acceptable to rate payers.

## 1. Introduction and Context

### 1.1 Background

- 1.1.1 Driven by legislative targets, financial penalties and government incentives, waste management has become a high growth industry.

Targets to increase recycling and re-use of waste materials have been set down in legislation by the devolved UK administrations, emanating from the EU Waste Framework Directive (2008/98/EC). In Northern Ireland, the Waste Regulations (Northern Ireland) 2011 have set a target that, by 2020, 50% of household waste should be recycled or prepared for re-use. The same target has been set in the Waste (England and Wales) Regulations 2011.

It is anticipated that EU recycling targets will continue to rise. Indeed, the European Commission has published a proposal to increase the municipal waste recycling target to 65% by 2030.

Following the BREXIT vote, and pending implementation of BREXIT, there is a level of uncertainty around the UK and Northern Ireland's future position on EU legislation. For example, in the case of a 'soft Brexit', it is likely that the UK will be required to adopt EC legislation and there will be a form of continuity with the current scenario. On the other hand, in the case of a 'hard Brexit', it is possible that the UK will move outside the direct influence of the EU.

However, in either case, there will still be strong environmental and economic arguments to support continued increases in levels of recycling and re-use of waste; arguments which are gaining more and more prominence in line with the movement towards a more circular economy. Indeed, BREXIT may even strengthen these arguments, as moves towards a more circular economy will help to build resilience in the domestic market and protect against currency risk and dependence on import/export markets.

- 1.1.2 Within Northern Ireland, there have been, and continue to be, considerable efforts made to first and foremost reduce the levels of waste produced, and then to develop systems to encourage and facilitate more re-use and recycling of waste (through segregation, collection and sorting). As a result, there has already been an encouraging decrease in the amount of waste disposed to landfill and an accompanying increase in levels of recycling.

However, recycling targets are mainly based on weight and, whilst the proportion of waste moving into the recycling route has increased, the recyclate materials are not

always of an adequate quality for higher value reprocessors. This is a challenge faced by many recycle reprocessors and can mean that the full resource potential is not being recovered.

Thankfully, there is increasing recognition amongst policy makers, within and outside of waste management, of the valuable resource potential held within waste. The challenge for society and industry is now to develop ways to ensure that this resource value is fully recovered and matched to the needs of the best value market outlets.

1.1.3 This school of thought is in line with the principles behind the development of more circular economies - a direction of travel which is gaining momentum across Europe. The importance of moving towards a circular economy has been recognised in Northern Ireland's draft Programme for Government and the core principles of a circular economy are central to Northern Ireland's Waste Management Strategy: a lifecycle approach, focus on resource efficiency and the principle of proximity which favours using processing facilities in Northern Ireland to treat and recover value from the waste generated in Northern Ireland.

However, to achieve its targets and a more circular approach to waste management, Northern Ireland needs to have:

- effective and efficient waste collection and sorting systems;
- sufficient recycling and treatment capacity; and
- secure markets for the recycle and recovery outputs.

## 1.2 The Scoping Study

1.2.1 In 2015/16, a group of Northern Ireland-based SMEs in collaboration with a number of public sector organisations came together to explore ways by which more value could be recovered from household collected recyclates generated in Northern Ireland, by aligning with the recycle needs of local value reprocessors and with the principles of a circular economy

The Network comprised private and public sector organisations spanning recycling, reprocessing and waste collection.

- Cherry Plastics Group (plastics reprocessor);
- Encirc Ltd (glass cullet reprocessor);
- Huhtamaki Lurgan Ltd (paper reprocessor);
- AgriAD (food waste reprocessor);
- Bryson Recycling (recycling services provider);
- Antrim and Newtownabbey Borough Council;
- Armagh City, Banbridge and Craigavon Borough Council;



- Belfast City Council;
- Lisburn and Castlereagh City Council; and
- Mid and East Antrim Borough Council.

*(Department of Agriculture, Environment and Rural Affairs (“DAERA”) and The Waste and Resource Action Programme (“WRAP”) had an observational role in the Network.*

The members shared a common goal – through collaboration and a better understanding of needs within the supply chain, to explore ways to create a more circular approach to the collection, management and reprocessing of household recyclates in Northern Ireland.

1.2.2 Invest Northern Ireland provided financial support, through its Collaborative Growth Programme, for the Network to carry out a Scoping Study, to identify the recyclate needs of the reprocessing sectors represented within the Network and how these needs, and the growth of the reprocessing sectors, could be supported through more collaborative working and new approaches within the household recyclate supply chain. Kappa Consulting was appointed to assist with the development of this scoping study.

The main objectives of the Scoping Study were:

#### Demand: Reprocessors’ Recyclate Needs

- Define the recyclate needs of the reprocessors involved in the Network, in terms of volume, quality and sources of supply.
- Assess the extent to which these needs are currently met from within Northern Ireland (and therefore through a circular economy).
- Identify any difficulties or challenges encountered in sourcing adequate supplies of recyclate and the impact on the respective businesses.

#### Supply: Local Authority Collected Household Recyclate

- Detail the levels of household recyclate currently available within Northern Ireland and how this compares with current and future demand from the reprocessors.
- Outline the collection systems currently employed by the local authorities.

#### Conclusions: The Opportunity for Supply Chain Collaboration

- The strategic and economic argument for a circular economy.
- The commercial and economic impact that an increased and higher quality local recyclate supply could have on reprocessors.

- Key factors under consideration by the local authorities on the Network in defining their collection systems and the future development of their waste management plans.
- Opportunity for ongoing collaboration to address this strategic issue.

The parameters and focus of the Scoping Study were on: **household collected recyclates** the three main dry domestic recyclate waste streams (**paper, glass, plastics**) as well as **food waste**, and on the opportunities for the reprocessing sectors represented on the Network.

## 2. Demand: Recyclate Needs of NI Reprocessors

### 2.1 Reprocessor Profiles and Recyclate Needs

2.1.1 As noted earlier, the focus of the Scoping Study has been on the three main domestic dry recyclate waste streams – glass, paper and plastic – and on household collected food waste.

The Network’s membership includes the three main reprocessors of dry recyclate in Northern Ireland:

Reprocessor	Recyclate Currently Reprocessed	Recyclate stream source
Encirc	<ul style="list-style-type: none"> <li>- Green glass cullet</li> <li>- Amber glass cullet</li> <li>- Clear glass cullet</li> </ul>	Glass bottles and jars
Huhtamaki Lurgan	<ul style="list-style-type: none"> <li>- White paper fibre</li> <li>- Grey paper fibre (limited ink)</li> </ul>	Paper and cardboard
Cherry Plastics	<ul style="list-style-type: none"> <li>- Polypropylene</li> <li>- Polyethylene</li> <li>- PET</li> </ul>	Plastics

The Network membership also includes AgriAD, a developer of commercial anaerobic digestion plants. Household collected food waste currently mainly goes for composting. Anaerobic digestion represents an additional and alternative reprocessing route for household food waste.

Other dry waste streams arising from local authority household segregated waste collection (such as metals, low length fibre paper and corrugated cardboard, and plastics other than bottles, pots, tubs and trays) are not within the remit of this Scoping Study and are not currently represented on the Network.

The following sub-sections provide an overview of the recyclate needs of each of the reprocessors represented within the Network, in terms of their current and projected usage of recyclate materials, their quality requirements and the extent to which these needs are currently being met within Northern Ireland.

2.1.2 Encirc

<b>Company Profile – Activities and Size</b>
<p>Encirc Ltd is part of the Vidrala Group, a Spanish owned glass manufacturing group with eight sites throughout Europe. Encirc Ltd is responsible for operations in the UK and Ireland, employing 1,200 staff across two separate sites: one in Derrylin, Co Fermanagh and one in Elton, Cheshire. The Derrylin site is a manufacturing plant for glass bottles and containers for the food and drink sector, whilst the Elton plant is for glass manufacturing and contract bottling.</p> <p><u>Encirc Ltd, Derrylin</u></p> <p>Encirc is a major player in the Northern Ireland economy:</p> <ul style="list-style-type: none"> <li>- Employing 441 staff at the Derrylin site, Encirc is one of the largest employers in Fermanagh, and indeed Northern Ireland.</li> <li>- Encirc is a major exporter, generating income into the Northern Ireland economy. Exports account for the vast majority of Encirc’s sales. Encirc accounts for almost a third of the total GB market and is by far the dominant player in Ireland.</li> <li>- Encirc is a growing business and, at a time when other major employers have been downsizing, Encirc has continued to invest in the long-term development of its facility in Fermanagh. For example, in 2016, more than £650k was invested in refurbishing the furnaces at Derrylin to improve productivity and efficiencies, and the company is planning a major rebuild investment in the furnaces in 2019 and 2021.</li> </ul>
<b>Use of Recyclate Materials</b>
<p>Encirc uses <b>recycled glass (“cullet”)</b> along with virgin materials to manufacture green, amber and clear glass containers.</p> <p>Encirc currently purchases over 100,000 tonnes/yr of recycled glass. However, if it was available, they could use significantly more.</p> <p>Currently, the average mix for manufacturing all coloured glass is 60% cullet and 40% virgin materials.</p> <p>Whilst virgin materials are currently cheaper than glass cullet, the energy and labour costs associated with manufacturing fully from virgin materials are significantly higher than manufacturing from glass cullet – these costs more than offset the differential between the cost of cullet and virgin materials. For example, every 10% use of glass cullet can correspond to a 2.5% reduction in furnace temperature – which reduces energy costs and carbon emissions. A study by Carbon Trust for British Glass identified that the energy requirement to produce 1 tonne of glass was 793 kWh, but when cullet is used there is an energy saving of 343kWh.</p> <p>Therefore, a key strategic aim for the company is to increase the cullet fraction in its products - not only from a cost perspective but also in support of Encirc’s environmental and sustainability credentials.</p>

This has become a key strategic project for the company, with aspirations to increase the cullet fraction in its green and amber products to 90%. The critical factor in achieving this aspiration will be sourcing adequate supplies of cullet at the required quality levels.

Clear glass is currently 30%-40% cullet/60%-70% virgin materials. It is difficult to increase the cullet fraction in clear glass, as consumers are sensitive to any discoloration in clear glass containers. Discoloration can be caused by only small quantities of green and amber glass within the cullet. If customer tolerances change, Encirc would be keen to also introduce more cullet into clear glass.

#### **Current Sources of Glass Cullet**

Of the 100,000+ tonnes of cullet used annually, Encirc currently sources 26% from Northern Ireland and the balance from the Republic of Ireland.

The cullet is supplied from Glass Recycling Facilities (“GRFs”) which segregate the glass by colour, remove any contamination and prepare a uniform product to Encirc’s specification. Contaminants can include items such as pyrex, ceramics, plastics and pieces of masonry/small stones etc. Using optical sorters, the glass pieces are sorted by colour and size. Glass smaller than 8mm wide is discarded and used for secondary material such as aggregates.

Glass from comingled collections is generally too contaminated to be recovered, as the processing and sorting costs are considered to be prohibitive for the GRFs. Indeed, the main Northern Ireland GRF will only accept glass that has been collected separately. Therefore, for Encirc, the availability of glass cullet from Northern Ireland is directly linked to the quantity of glass recycled through separate collection channels.

In the Republic of Ireland, it has been recognised that, unless glass is collected separately, it is unlikely that it will be diverted from landfill and recycled. Therefore, bye-laws have been introduced by a number of local authorities preventing comingling of glass with other waste materials. As a result, the Republic of Ireland tends to have a larger supply of non-comingled glass recycle.

#### **Recyclate Quality Requirements**

Encirc can use cullet from any type of glass, except pyrex, car windows, crystal and ceramics, but has a clear quality specification in terms of particle size, colour and contamination level. The cullet must be clean and uncontaminated, with contamination levels set at <1%.

Cullet is delivered with a Certificate of Conformance confirming the quality of the cullet. At times, deliveries of cullet are sample checked by Encirc at reception before they are accepted into the factory. If a load does not meet the quality check, it is rejected and returned to the supplier, at no cost to Encirc. However, rejection levels are minimal at this stage (less than 0.1%), as generally the GRF’s will have ensured that the material meets the required standard before delivering to Encirc.

### 2.1.3 Huhtamaki Lurgan

#### Company Profile – Activities and Size

Huhtamaki Lurgan Ltd is part of a Finnish owned multi-national company specialised in manufacturing food and drink packaging.

The plant in Lurgan has a turnover of £36million and manufactures moulded fibre egg packaging and cup carriers. It was the first purpose-built mill in Europe producing moulded products from paper pulp. It is now the only one of its kind in the UK and Ireland, supplying the majority of egg cartons to all major supermarkets, cup carriers to McDonalds and supplying other leading food service chains.

Huhtamaki is a market leader throughout Europe, with a strong blue chip client base. The Company is growing year-on-year, and market trends and company plans would indicate that this growth trajectory should continue.

Huhtamaki is a major contributor to the Northern Ireland economy. With approx 220 employees, it is one of the largest employers in the Armagh City, Banbridge and Craigavon Council area and supports an extensive supplier base from Northern Ireland. The Company has continued to invest in its Northern Ireland facility. Indeed, in 2016 Huhtamaki invested £5m and created 10 new jobs installing a new production line in the plant, and further investment is anticipated.

#### Use of Recyclate Materials

Huhtamaki's products are fully recyclable and manufactured from recycled ***post-consumer/domestic paper, newspapers and magazines and post-industrial paper off-cuts.***

Whilst Huhtamaki can use material that has been in contact with food, the Company prefers to avoid it and focus on newspapers, magazines and 'clean' paper.

Post-consumer newspapers and magazines are used to make grey pulp, and are supplied from domestic kerbside collections, bring sites and civic amenity centres.

Huhtamaki Lurgan uses c26,000 tonnes of recyclate paper per annum (of which 16,000 is post consumer grade). Through its processing, Huhtamaki estimates that it increases the value of its recyclate paper c10 fold.

#### Current Sources of Recyclate Materials

Huhtamaki sources approximately half of its post consumer material from Northern Ireland, but reports that only 10% comes from its local council area

Paper is costly to transport and so, the closer the supplies of recyclate are to the factory, the better. Indeed, Huhtamaki reports that it could use all of the post-consumer recyclate paper available from its local council area, if it was collected in a way that ensured the appropriate quality levels.

From Huhtamaki’s experience, co-mingled collections do not deliver the required levels of quality. This experience is shared with Huhtamaki’s sister companies across Europe. Since 2000, Huhtamaki has seen the quality and supply of recyclate paper change significantly, with the introduction of co-mingled collections. Historically recyclate paper from households was collected as a single stream and from paper banks. However, as comingled collections were introduced, initially with a limited mix of materials in the wheelie bin (typically cans, plastic bottles and cardboard), the quality has dropped notably.

#### **Recyclate Quality Requirements**

As Huhtamaki’s products are for the food and drink sector, the quality levels must be very high and free from contamination. Huhtamaki supports the Resource Association’s ReQip quality standards that limit contamination in paper for recycling to no more than 0.5%.

Contaminants entering Huhtamaki’s supply stream are generally rejected and removed during the pulping process. However, before they are rejected, some paper fibres will have wrapped around the contaminants, and so they are also rejected; this represents a loss to the business, as well as the loss resulting from production inefficiencies.

Huhtamaki has found that, when using co-mingled paper, its wet reject rates are typically 10% +, whereas the wet reject rate for paper collected through kerbside sort is only 2%-3%. (Wet losses are the weight of contamination increased by water and pulped material that adheres to the contamination. As a rule of thumb, the weight of initial contamination can be increased by a factor of two or three to arrive at the wet loss figure.) Only small increases in contamination have very significant implications to a company such as Huhtamaki.

Contaminated recyclate leads to:

- a ‘lost material cost’, as the rejected material will have formed part of the tonnage of recyclate paid for by the company;
- an additional cost, to have the rejected material collected and disposed of;
- downtime in production and labour costs to process and clear any blockages created in the manufacturing process;
- efficiency losses and compromising the quality of the finished goods, which can reduce output capacity by c10%; and
- increased electricity and water costs.

## 2.1.4 Cherry Plastics Group

### Company Profile – Activities and Size

Cherry Plastics Group has three sites across Northern Ireland, employing 65 staff and using highly technical, state of the art technology to reprocess plastic bottles:

- A Plastics Recycling Facility (“PRF”) near Crumlin, Co Antrim. This facility takes mixed waste plastic and uses a near infrared system to sort and separate the plastic into high density polyethylene (HDPE), polypropylene (PP) and polyethylene terephthalate (PET). The HDPE and the PP are then forwarded to the company’s polyolefin extrusion plant in Lurgan and the PET, which accounts for c50% of the output of the PRF, is exported to PET reprocessors in GB and mainland Europe.
- A Polyolefin washing, extrusion and repelletising plant in Lurgan, Co Armagh, where the segregated HDPE and PP bottles go through a wash plant to remove contamination, and are then granulated and dried into a black or coloured pellet, depending on the product to be made. The repelletised product is a specifically developed blend and is branded as “Cherrylene rHDPE.” It is then supplied to Cherry Pipes’ third site in Dungannon, where it is reprocessed into plastic drainage pipes, and is also sold to external customers.
- A Plastic Reprocessing Facility (“Cherry Pipes”), which operates from a site in Dungannon, Co Tyrone and reprocesses the Cherrylene rHDPE into plastic drainage pipes for civil engineering, construction and agricultural customers throughout Europe.

Cherry Plastics is a locally owned company, operating for almost 50 years and creating employment across two different council areas (Antrim & Newtownabbey; Armagh, Banbridge and Craigavon).

### Use of Recyclate Materials

Cherry Plastics processes ***mixed plastic recyclate*** in HDPE, PP or PET. It cannot take PVC, ABS or polystyrene.

Post consumer plastics are sourced from a number of MRFs throughout the UK and from Bryson Recycling, in addition to some post commercial plastic waste (provided it is clean enough) and post industrial plastic waste (which is usually very clean).

The company currently uses c16,000 tonnes of post-consumer plastic recyclate per annum (incl 2,000 tonnes from inter-group supplies). The main target polymer for Cherry Plastics is HDPE, which is most commonly used in plastic milk bottles.

Many household recycling collections in Northern Ireland now co-mingle the collection of plastic bottles with plastic pots, tubs and trays. Co-mingling has added an additional challenge to the sorting process that has to be carried out by Cherry Plastics, due to the additional polymer types added by the inclusion of pots, tubs and trays. Not all of these polymers are target items for Cherry Plastics. Polystyrene, PVC and black trays in



particular are not recycled by Cherry. As a result, Cherry incurs higher costs associated with additional sorting, reject materials and contamination moving through its processes.

#### Current Sources of Recyclate Materials

To get the quality of plastic recyclate required for its processes, Cherry Plastics has import recyclate materials. Of the c14,000 tonnes (excl the 2000 tonnes from inter-group supplies) of post-consumer recyclate bought per annum, less than half (i.e. 6,000 tonnes) is from Northern Ireland. The balance is mainly from GB, as well as some supplies from mainland Europe.

The 14,000 tonnes of post-consumer recyclate supplied to Cherry Plastics per annum (adjusted for double counting) is made up of:

- 8000 tonnes of plastic supplied to the PRF from MRFs, of which 75% (i.e. 6,000 tonnes) is from NI and the balance from GB; and
- 8,000 tonnes of HDPE and PP supplied to the Polyolefin plant, of which c2,000 tonnes com from Cherry's in-house PRF (*the 2000 tonnes supplied from the in-house PRF is not included in the total tonnage of supplies, to avoid double counting*) and the remainder is from GB.

Therefore, less than half (43%) of Cherry Pipes' plastic recyclate requirement is currently supplied from Northern Ireland. The majority of these supplies are from the Bryson MRF ("Materials Recycling Facility") and separately collected materials from Bryson, and the balance is from other MRFs.

If adequate supplies were available,, Cherry Plastics would much prefer to source locally from within Northern Ireland. Cherry reports that sourcing from GB incurs additional transportation/delivery charges of c£55-£60 per tonne and so, if adequate supplies were available, the company would much prefer to source from within Northern Ireland, thereby saving on shipping costs.

#### Recyclate Quality Requirements

It is critical that the recyclate supplied to Cherry Plastics is as clean as possible and free from contaminants. Any contamination can go on to create down-time in production and defects in the plastic pipes and end products manufactured from the repelletised plastic.

- Any non-plastic materials received from the MRFs (e.g. cardboard, steel, food etc.) have to be removed in the PRF and sent to landfill. This landfilled material could potentially have been recycled elsewhere if it had been segregated before reaching the PRF, but it is now lost to the recycling system. In addition, this reject material represents a triple cost to the company, from the initial purchase price and then the subsequent disposal cost, followed by having to buy additional recyclate to replace the rejected supplies – in addition to the maintenance and wear and tear costs associated with contaminants causing obstructions in the PRF, including large items and glass ripping conveyor belts.
- Cherry Plastics has a Near Infra-Red ("NIR") sorting system, which is effective at

sorting out non-plastics, but difficulties can arise as a result of the design and labelling of some recyclate products. For example, the NIR system sees HDPE bottles with PVC labelling sleeves as PVC bottles, which triggers unnecessary rejection of a valuable raw material resource. Furthermore black plastic does not reflect IR radiation and so it becomes invisible and is not removed from other segregated streams and causes contamination.

- Any contamination which passes through the PRF can go on to cause defects and non-conformities in Cherry Plastics end-product (ie the plastic pipes). These defects can, in turn, cause a ‘blow out’ to occur in the pipe. If this happens, the pipe is rejected and cannot be sold. If the contamination is identified and removed, the recovered non-contaminated material can be reprocessed, but the contaminated material still has to be disposed to landfill. Even when the non-contaminated material can be recovered, any level of contamination still results in a loss of material, a drop in yield from the factory, and wasted costs in labour and energy to process the contaminated material.

Grading standards, and therefore the quality of the plastics recyclate, varies between different MRFs. Therefore, contamination needs to be controlled and contained right at the start of the supply process, at the collection stage.

### 2.1.5 AgriAD

<b>Company Profile</b>
<p>AgriAD is a developer of commercial anaerobic digestion projects. The company is based in Banbridge, Co Down, and was established in 2010.</p> <p>AgriAD currently has a 500kW AD plant, currently recovering value from 18,500 tonnes per annum of agricultural feedstock sourced from three farms in the Banbridge area. The plant became operational in November 2015.</p>
<b>Use of Recyclate Materials</b>
<p>AgriAD currently has a demand for agricultural feedstock, which is sourced directly from farmers. However, the company has a potential future demand for household food recyclate, as a feedstock for future AD developments.</p> <p>AgriAD already has approved planning permission for a second 2MW plant, in the Belfast Harbour estate. This plant will require a feedstock of 70,000 tonnes per annum. The feedstock supply has not been finalised. If a reliable and suitable source of food waste was available, this plant could be fully fuelled by household food recyclate or co-fuelled by food recyclate and agricultural feedstock. Section 3.3.1 details the recyclate demand of the reprocessors included in the scoping study. In the case of food recyclate and AgriAD, we have allowed a very conservative estimate representing 25% of the feedstock requirement of the proposed AD plant in the</p>

Harbour Estate.

The company also has a further pipeline of projects which could provide a further reprocessing outlet for up to 150,000 tonnes of feedstock per annum. This potential has conservatively not been included in the demand estimates detailed in Section 3.3.1, but is a clear indication of the potential for growth.

**Sources of Recyclate Materials**

Having a secure and reliable feedstock is a critical element in the feasibility and viability of AD operations. Household food waste represents a largely untapped source of feedstock. A secure and reliable supply of food waste would not only greatly strength the business case for AgriAD’s pipeline of AD developments, but the AD developments would also offer councils an environmentally and resource efficient treatment option for food waste.

Preventing and minimising the amount of food waste going to landfill is now a priority for most administrations. In April 2016, the Food Waste regulations (Northern Ireland) required businesses producing a minimum volume of food waste to present the waste separately for collection, and initiatives are underway to try to encourage more households to make their food waste available for recycling.

However, within Northern Ireland, household food waste is currently collected as a co-mingled waste, as part of the organic waste stream that also includes garden waste and pet waste. This waste is collected and composted. Bryson has carried out a pilot food collection programme in the Greater Belfast area but, as yet, there is no mainstream system for separately collecting food recyclate.

Advice from WRAP is that the best environmental treatment of food waste is for it to be anaerobically digested, as this generates biogas which can be used as an energy source, such as for the generation of electricity or as a fuel for vehicles. The anaerobic digestion process used to convert the food waste to biogas can also generate fertiliser and compost or soil improvement by-products.

**2.2 Challenges with Recyclate Supplies**

The following table summarises the reprocessors’ feedback regarding the challenges that they face in sourcing adequate supplies of recyclate and the impact that these challenges have on their respective businesses.

Reprocessor	Key difficulties faced with recyclate supplies – availability, quality, cost of supply ....	Impact if these issues were addressed
<p><b>Encirc</b></p>	<p>As noted previously, by the time the glass cullet reaches Encirc, it is generally within specification:</p> <ul style="list-style-type: none"> <li>- The first and principal quality check carried out by Encirc is on delivery and before the recyclate is accepted into the manufacturing process. Rejection rates at this stage are minimal.</li> <li>- Encirc then checks for contamination throughout its manufacturing process. If contamination is detected, the bottle is rejected, sent to a crusher and returned to the furnace. This loop continues until the level of contamination is within spec. This ‘contamination clearance’ loop adds to the processing cost of that individual product and also reduces throughput capacity. However, rejection levels at this stage are relatively low and have been reducing. Over the last 3 years, pack rates (i.e. the proportion of bottles passing through the manufacturing process without rejection) have increased by 5-10 percentage points.</li> </ul> <p>Encirc’s main challenge is securing <u>sufficient volumes</u> of quality glass cullet. Encirc could use more cullet if it was available, not only to drive growth but also to increase the cullet fraction in its glass blends.</p>	<p>Securing increased and reliable supplies of glass cullet is a key strategic priority for Encirc. If more glass cullet was available within Northern Ireland at the required quality levels, Encirc would be able to:</p> <ul style="list-style-type: none"> <li>◆ increase the cullet fraction in its blends for green and amber glass, which would in turn:                             <ul style="list-style-type: none"> <li>- save on energy and labour costs, and thereby improve cost efficiencies and profitability; and</li> <li>- reduce Encirc’s carbon footprint, by reducing fossil fuel energy consumption, reducing carbon emissions and increasing recyclate usage.</li> </ul> </li> <li>◆ drive continued growth in the business, providing Encirc with the confidence to make decisions to expand production and, therefore, employment.</li> </ul> <p>In summary, Encirc is confident that, if more glass cullet was available in Northern Ireland at its quality specification, it would improve the company’s ability to grow and create additional jobs, result in cost savings, enhance profitability and reduce environmental impact.</p> <p>Indeed, Encirc has indicated that, if available at the required quality specification, it could increase its annual cullet usage by an additional 40%.</p>

Reprocessor	Key difficulties faced with recyclate supplies – availability, quality, cost of supply ....	Impact if these issues were addressed
<p><b>Encirc (contd)</b></p>	<p>The issue for Encirc is the quantity of glass which could be reprocessed but, due to contamination, is not being made available to Enirc - either being rejected from the recycling stream and going to landfill or going to lower value recycling applications (such as aggregates).</p> <p>From the company’s experience to date, Encirc has found that kerbside sorting has proven to be the most effective way to minimise contamination – a view shared by the GRFs – and thereby increase the volume of glass recyclate available for higher value reprocessing. Better segregation means lower contamination and higher quality, which in turn means higher recycling rates.</p> <p>There is also an imbalance between the colour of glass cullet available and the colour required by the UK market. The UK tends to import proportionately more green glass than amber or clear. However, the drinks export market in the UK uses significantly more amber and clear glass. As a result, amber glass cullet is particularly in under-supply.</p>	<p>In summary, Encirc employs 440 staff and currently uses in excess of 100,000 tonnes of cullet per annum. If adequate supplies were available, Encirc could increase its glass cullet purchases by a minimum of 40%, increase the cullet fraction in its products (reducing energy consumption, carbon emissions and production costs) and increase production volumes (creating additional jobs).</p>

Reprocessor	Key difficulties faced with recyclate supplies – availability, quality, cost of supply ....	Impact if these issues were addressed
<p><b>Huhtamaki Lurgan</b></p>	<p>Huhtamaki has found that it is difficult to source sufficient recyclate paper within Northern Ireland to the quality levels needed for its manufacturing process.</p> <p>Over the last decade, there has been a general societal shift from printed to digital media. As a result, the quantity of waste paper generated per head of population has been in decline. There has also been an increase in the level of plastics, card and general contaminants included in the comingled mix along with paper, and some councils in Northern Ireland have even extended the range of materials accepted in comingled collections, to include items such as textiles, batteries, small electrical items and a wider range of plastics and glass. This combination of events has made it all the more challenging for Huhtamaki to source post-consumer paper from within Northern Ireland at the required levels of non-contamination.</p> <p>Given these trends, and the impact that contaminated material can have on the business, Huhtamaki has decided to only buy post-consumer materials that have been collected separately from other materials.</p>	<p>The availability of suitable post-consumer material is a key determinant for Huhtamaki when considering growth plans and any increase in capacity.</p> <p>If more recyclate paper was available in Northern Ireland at the quality levels required, and particularly from the immediate council area, Huhtamaki reports that it would be in a stronger position to grow its capacity and production levels, in turn increasing both employment and export levels. In addition, if the need and cost of importing recyclate material was reduced, Huhtamaki would also be in a stronger position to compete against imports into the UK and ROI markets from other mainland European competitors.</p> <p>On the other hand, if more supplies of quality recyclate do not become available, future investment in the Lurgan site could be compromised. It is significant that Huhtamaki’s Northern Ireland site is only one of a number of similar Huhtamaki manufacturing sites in Holland, France and the Czech Republic.</p>

Reprocessor	Key difficulties Faced with recyclate supplies – availability, quality, cost of supply ....	Impact if these issues were addressed
<p><b>Huhtamaki Lurgan (contd)</b></p>	<p>The result is that the only post consumer material from this island that is now deemed suitable for recycling by Huhtamaki is material collected using either a kerbside sort box system or paper banks. Huhtamaki’s experience shows that, for its manufacturing operation, kerbside sorting provides a much cleaner uncontaminated material, which in turn improves its cost and production efficiencies.</p> <p>The predominant supplier of post-consumer paper to Huhtamaki is currently Bryson Recycling. Bryson operates the Arc21 Materials Recovery Facility (MRF) contract for the Eastern region of Northern Ireland and also operates a kerbside sort service for c180,000 houses supplied with kerbside boxes.</p>	<p>All of these other sites have a reliable supply of recyclate material <i>which is collected through separated collection systems</i> and they are reporting only 2% reject rates. When considering expansion plans at a Group level, Huhtamaki will consider the relative merits of each of its manufacturing plants, as well as the potential within their customer base.</p> <p>Huhtamaki has estimated that, if its reject levels were reduced from 10% to &lt;4% wet reject, it would have 500 tonnes less reject material to handle each year, which equates to c60 fewer vehicle movements onto and off the Lurgan site – not only cost and efficiency savings for the company, but also a significant improvement on environmental impact.</p> <p>Furthermore, as the standards around food packaging continue to tighten, there is always the risk that, if the quality of the recyclate cannot be improved, retailers could eventually ban the use of post consumer material due to fears around contamination from the packaging onto the food or drink product. Such a decision would not be taken lightly by retailers and food service companies, as many value the environmental credentials associated with using recycled materials. However, it is always a possibility if quality continues to be an issue.</p>



Reprocessor	Key difficulties faced with recyclate supplies – availability, quality, cost of supply ....	Impact if these issues were addressed
<p><b>Huhtamaki Lurgan (contd)</b></p>	<p>In summary, Huhtamaki employs 220 staff and uses 26,000 tonnes of recycled paper per annum, of which 16,000 tonnes is post consumer. If more post-consumer paper was available at the required quality levels from within Northern Ireland, demand could increase by at least 50% (ie an additional 8000 tonnes). Huhtamaki currently has to source approximately half of its material from outside Northern Ireland, which is expensive and places the company at a commercial disadvantage. Availability of recyclate at a suitable quality level is a key consideration in any expansion plans.</p>	<p>Paper has a relatively high transportation cost. Therefore, any supplies which have to be sourced from outside Northern Ireland put a significant additional cost burden on the Huhtamaki, and could compromise the long term sustainability of the operations in Northern Ireland.</p> <p>Huhtamaki has indicated that, if post-consumer paper was available locally at the required quality level, it could take a further 8,000 tonnes per annum. Huhtamaki has also identified opportunities to reprocess beverage cartons such as Tetrapak if they were available and segregated from existing paper waste streams.</p>



Reprocessor	Key difficulties faced with recyclate supplies – availability, quality, cost of supply ...	Impact if these issues were addressed
<p><b>Cherry Plastics</b></p>	<p>Cherry Plastics finds it difficult to source sufficient volumes of plastic (of an appropriate quality) from within Northern Ireland – mainly due to the levels of contamination inherent in co-mingled collections and co-mingled MRFs.</p> <p>Depending on the MRF supplier, intake reject levels at Cherry’s PRF can be as high as 40%. This level of rejects represents a significant cost to the company, in lost time, disposal, maintenance and materials costs. The cost of disposal in addition to the initial purchase price of the reject material can represent a composite cost to Cherry of approximately £200/tonne, in addition to the costs associated with maintenance and downtime and the reduced capacity as a result of the disruption on production.</p> <p>It is Cherry’s goal to reduce the intake reject levels to &lt;10% - from current levels of 30%-40%.</p> <p>Cherry Plastics reports that, from their experience, the highest quality material comes from kerbside sort collections and from the Arc21 Bryson operated glass free MRF. With the pressure to reduce reject levels, this is the only MRF in Northern Ireland from which Cherry Plastics regularly purchases plastic packaging.</p>	<p>Cherry’s drive is to expand its manufacturing capacity but, to do so, the Company needs to have more security that adequate supplies of plastic recyclate will be available locally at the required quality levels.</p> <p>If more recyclate was available in Northern Ireland, at the quality standards necessary to reduce reject levels to less than 10%:</p> <ul style="list-style-type: none"> <li>- Cherry would be in a position to drive forward its ambitions for expansion, reinforcing the security of the business and creating additional employment;</li> <li>- Production efficiencies, yield and production capacity would be enhanced, as less downtime would be incurred as a result of contaminated materials;</li> <li>- The company would achieve cost savings associated with the disposal of reject materials to landfill, wear, tear and maintenance costs associated with contaminated materials moving through the production process and savings on transportation costs associated with sourcing materials from GB;</li> </ul>



Reprocessor	Key difficulties faced with recyclate supplies – availability, quality, cost of supply ....	Impact if these issues were addressed
<p><b>Cherry Plastics (contd)</b></p>	<p>In summary, Cherry Plastics employs 65 staff and uses 14,000 tonnes of post-consumer plastics per annum. Less than half of the recyclate plastic comes from Northern Ireland. The Company has expansion plans but the availability of adequate and secure recyclate supplies from within Northern Ireland is critical to any investment decision. If more recyclate was available from Northern Ireland, Cherry Plastics could immediately introduce a third shift (creating 12 additional jobs) and expand to double its demand for recyclate.</p>	<ul style="list-style-type: none"> <li>- The company would see productivity improve, as a result of less unproductive processing time and recyclate wastage; and</li> <li>- The two production shifts currently operating would be secured, and the Company would consider plans to introduce a third shift, which would create 12 additional jobs across the three sites.</li> </ul> <p>Cherry Plastics has indicated that, if more recyclate was available in Northern Ireland at the required quality level, it could take a further 14,000 tonnes per annum.</p>

### 3. Supply : Local Authority Collected Household Recyclate

#### 3.1 Supply and Demand

3.1.1 This section of the report considers the levels of household recyclate available within Northern Ireland, compared with the levels of recyclate required by the reprocessors in the Network – ie. comparing **local supply capacity** with **local demand**.

The '**local supply capacity**', for each of the four waste streams under consideration (glass, paper, plastic and food), is based on statistics drawn from DAERA's WasteDataFlow reports:

- the tonnage of waste currently produced by households in Northern Ireland, and which should therefore be available for recycling;
- the tonnage that is currently collected by local authorities (showing kerbside collections only and then the collections including civic amenity and 'bring' sites); and
- the proportion of waste produced by households that is collected kerbside (known as the 'kerbside capture rate').

WasteDataFlow is a web-based system developed for local authorities in England, Scotland, Northern Ireland and Wales, to report information on municipal waste collection and management. WasteDataFlow was developed to replace various different municipal waste management surveys, and provide a single comprehensive data return and monitoring of progress against Article 5 of the Landfill Directive.

The '**demand** for the recyclate' is based on the feedback and needs of the 4 reprocessors in the Network, representing high value reprocessing options currently operational in Northern Ireland.

The analysis also considers the tonnage of recyclate currently sourced from Northern Ireland, but also the potential additional demand for recyclate if more material was available from Northern Ireland at the appropriate quality levels. This analysis illustrates the 'gap' between the quantities of recyclate currently sourced from Northern Ireland and the quantities that could be channelled through these higher value recycling routes, if appropriate collection systems were in place.

3.1.2 The section also considers the collection systems used (at the time of writing) by each of the local authorities in the Network, any specific plans to develop their collection systems and the key factors for them when considering changes in their approach to waste collection.

### 3.2 SUPPLY – Household and Local Authority Collected Waste

#### 3.2.1 Levels of Household Waste and LACMW

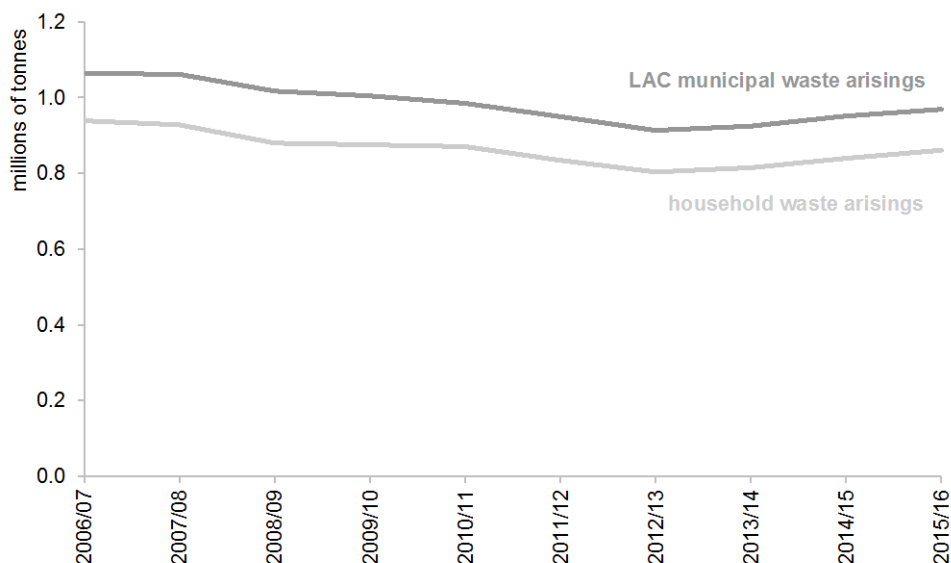
DAERA’s most recent annual report on household waste and local authority waste collection is for 2015/16.

Household waste refers to materials collected directly from households through kerbside collections or indirectly such as through civic amenity sites or bring sites; Local Authority Collected (LAC) municipal waste refers to waste which is collected under arrangements made by a district council, and includes waste collected directly and indirectly from households as well as other municipal waste collected by district councils. In 2015/16, household waste accounted for 89% of LAC waste.

In 2015/16, **household waste arisings** totalled 860,786 tonnes and LAC municipal waste totalled 969,157 tonnes.

The following graph shows that the volume of waste arisings fell between 2007/08 and 2012/13, but has been gradually increasing since 2012/13.

**LAC and Household waste arisings in Northern Ireland 2005/06 to 2015/16**



(Source: DAERA Annual Report (2015/16) for Northern Ireland Local Authority Collected Municipal Waste Management Statistics)

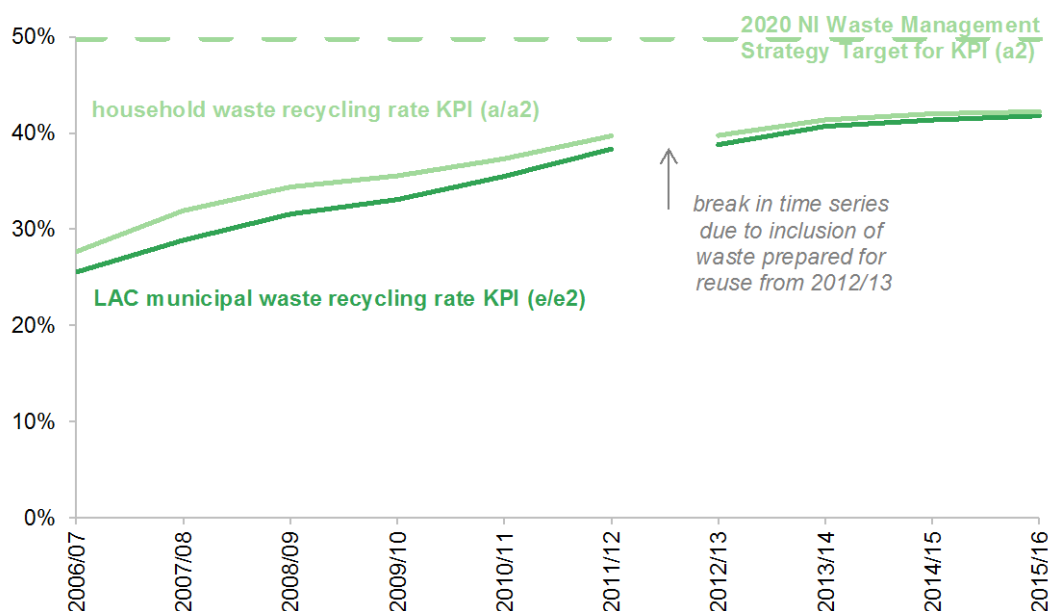
### 3.2.2 Waste Recycling Rates and Targets

Northern Ireland has legislative targets for recycling of household and LACMW waste. This sub-section shows that, whilst recycling rates have been increasing in Northern Ireland, they are still below target.

Household Waste Recycling Targets
<p><i>The Northern Ireland Programme for Government (PfG) set a target that, <b>by 2015, 45%</b> of household waste in Northern Ireland should be recycled or composted, whilst the Waste Regulations (Northern Ireland) have set a target that, <b>by 2020, 50%</b> of household waste should be either recycled or prepared for re-use.</i></p>
Local Authority Collected Municipal Waste (LACMW) Recycling Targets
<p>The EU Waste Framework Directive (2008/98/EC) <b>has</b> set a target that <b>50%</b> of Local Authority Collected Municipal Waste (LACMW) should be recycled <b>by 2020</b>. This target has been transposed into national regulations in the Waste Regulations (Northern Ireland) 2011.</p> <p>The Revised Waste Management Strategy for NI (<i>“Delivering Resource Efficiency – Northern Ireland Waste Management Strategy”</i>), published in October 2013, proposed an even higher target - <b>60%</b> of LACMW should be recycled by 2020. It was anticipated that this more ambitious target would help to ensure that the Waste Framework Directive target and the interim PfG target relating to household waste would both be met. The Department was to introduce a draft Bill for the new target in 2014, but there are, as yet, still no plans to present this Bill. Rather, it is seen as an aspirational target and, with LACMW recycling rates sitting at 41.8% in 2015/16, the target of 50% could now be challenging. <b><i>Post 2020 it is expected that there will be a shift in policy and targets, to encourage a more “Circular Economy” approach rather than purely volume-based targets.</i></b></p>

The following graph details actual recycling rates compared against the targets (ie the proportion of household waste and LAC municipal waste that is collected and sent for reuse, dry recycling and composting).

### LAC and Household Recycling Rates in Northern Ireland 2006/07 to 2015/16



(Source: DAERA, Annual Report (2015/16) for Northern Ireland Local Authority Collected Municipal Waste Management Statistics)

The method of reporting changed in 2012/13 to include waste prepared for reuse, resulting in the break in the timeseries in the graph below.

By 2015/16, the household waste recycling rate had reached 42%, just short of the PfG target of 45% and well behind the 2020 target of 50%. The dry recycling rate was 22% and composting rate was 20%, all similar to the 2014/15 rates.

It is notable that the increase in recycling rate seems to be slowing down, and may even be starting to plateau at just around 40% - suggesting that a new drive is required to boost another uplift in recycling activity.

#### 3.2.3 Levels of Waste Available and Collected, by Waste Stream

Through the information provided by WasteDataFlow we are able to directly derive the amount of glass, paper and plastic recyclate captured through LACMW collections in Northern Ireland. Information on food waste is not directly available as it is contained within compostable waste and, as yet, there is no comparable means to separately account for food waste tonnage within the compostable tonnage.

<b>Collection and Capture of Dry Recyclates</b>			
	<b>Glass</b>	<b>Paper</b>	<b>Plastic</b>
Tonnage available in household kerbside collections (residual and recyclate) (Source WasteDataFlow Table 21i and 21ii)	<b>44,947</b>	<b>108,448</b>	<b>69,441</b>
Tonnage captured for recycling from household kerbside collections (WasteDataFlow Table 21i and 21ii)	<b>17,835</b>	<b>60,085</b>	<b>11,010</b>
Household Kerbside Recycling Capture Rates ie tonnage of material recycled at kerbside as proportion of total tonnage available (WasteDataFlow Table 21i and 21ii)	<b>39.7%</b>	<b>55.4%</b>	<b>15.9%</b>
Tonnage collected for recycling from kerbside, civic amenity sites and bring site collections (WasteDataFlow Table 5)	<b>30,256</b>	<b>70,248</b>	<b>15,568</b>

From this table it can be seen that:

- the total tonnage of material collected for recycling (whether from kerbside, civic amenity or bring site collections) is 30,256 tonnes of glass, 70,248 tonnes of paper and 15,568 tonnes of plastic (ie these tonnages relate to the volume of material collected from kerbside, amenity sites and bring sites for recycling).
- The vast majority of this paper and plastic recyclate comes from kerbside recycling (86% of paper; 71% of plastic).
- In the case of paper, the recycling capture rate on kerbside collections is 55%. If collections through civic amenity and bring sites are included, this rate increases slightly to c60%.
- By comparison, the recycling capture rate for plastics is low - the capture rate for plastics on kerbside collections is only 16%, increasing to just over 20% when civic amenity and bring site collections are included. This may in part be due to the complex nature of plastic in the waste stream and the wide variety of polymer types and end uses.
- In the case of glass, civic amenity and bring sites play a more significant role as a channel for collecting recyclate, accounting for c40% of glass tonnage

collected for recycling. When civic amenity and bring site collections are included, the recycling capture rate for glass increases to just over 50%.

### 3.3 DEMAND – Reprocessor Demand for Recyclate

3.3.1 The following table details the levels of post-consumer recyclate currently supplied to the reprocessors in the Network, the amount sourced from Northern Ireland and the amount by which the reprocessors would increase their supplies from Northern Ireland, if adequate supplies were available at the required quality standards.

The ‘plastics’ figures relate to the recyclate supplied to and used by Cherry Plastic’s polyolefin plant.

Reprocessor Demand for Post Consumer Recyclate				
	Encirc/Glass (Green, amber, and flint cullet)	Huhtamaki/ Paper (Card, news&pams)	Cherry Plastics/ Plastic (HDPE and PP bottles)	AgriAD/Food
Tonnage <b>currently</b> received for reprocessing	100,000+	16,000	8,000	n/a
...of which is sourced from NI	26%	8,400	2,000 <i>(supplied from Cherry Plastics’ own PRF)</i>	n/a
...of which is imported to NI	74%	7,600	6,000	n/a
Potential increase in tonnage demand from NI, if more recyclate was available locally at the required quality standard.	40,000+	8,000	3,000	17,500

In addition, Cherry Plastics’ PRF currently sorts 8,000 tonnes of plastics per annum, of which 6,000 is supplied from Northern Ireland. The Company projects that this demand could increase by a further 8,000 tonnes per annum, if adequate supplies were available from Northern Ireland.



### 3.4 Mass Balance Conclusions – Recyclate Collection to Reprocessing in NI

The following table presents a mass balance analysis, detailing the amount of LACMW recyclate collected in Northern Ireland compared with the amount of LACMW recyclate that is supplied to the reprocessors in the Network as feedstock material.

NI Mass Balance – collection vs reprocessing			
	Glass	Paper	Plastic
LACMW tonnage collected for recycling (transferred to Primary Sort)	<b>30,256</b>	<b>70,248</b>	<b>15,568</b>
LACMW material supplied to NI reprocessors	<b>19,600**</b>	<b>8,400</b>	<b>2,000</b>
Tonnage of recyclate supplied from NI to the reprocessors as a % of total recyclate collected in Northern Ireland (Mass Balance Efficiency)	64%	12%	13%

*(\*\*The glass recyclate supplied to Encirc from the NI GRF may have come from both NI and ROI and, similarly, the glass recyclate supplied to the ROI GRF may have come from NI as well as ROI. Through industry discussions and WasteDataFlow, it is estimated that 19,600 tonnes of the glass cullet supplied to Encirc originates in NI))*

As shown, there would appear to still be considerable capacity within the Northern Ireland recyclate collections to increase supplies to the local reprocessors, provided that recyclate quality levels can be improved.

Currently, although there is detailed information on the tonnage of recyclate streams collected by the Local Authorities, there is only sparse information publicly available on the onward journey of these materials when they pass out of Local Authority hands.

The WasteDataFlow system contains detailed data on the collection and capture of recyclate material. However, our consultations with DAERA confirmed that there is no publicly available information on the ultimate destination of this “recyclate” material once it passes into the ownership of the processors, and that information is not available through PRN/PERN records or records under waste management licencing, PPC permits or environmental permits; this appears to conflict with the “Duty of Care” obligation for waste brokers (i.e. Local Authorities) and waste managers (MRFs) which states the following;

*“You have a responsibility to take all reasonable steps to ensure that when you transfer waste to another waste holder that the waste is managed correctly throughout its complete journey to disposal or recovery. ...”*

It would be useful and supportive of the principles of moving towards a more circular economy, if a system could be developed to measure the onward ‘journey’ of recyclate collected in Northern Ireland and the value recovered from the recyclate.

### **3.5 Local Authorities – Current Collection Systems**

This sub-section provides a summary of the collection systems used (at the time of writing) by each of the local authorities participating in the Network, profiling the collection systems currently employed and any plans to develop their collection systems.

Council	No. households and recycling rate	Current collection systems	Future plans and key considerations
<p><b>Mid and East Antrim</b></p>	<p>55,000 households.  Currently 45% recycling rate.</p>	<p><u>Dry Recyclables</u> A combination of the Bryson Box and co-mingled blue bin:</p> <ul style="list-style-type: none"> <li>- Ballymena/Carrickfergus: a Bryson Box. The quality of recycle is high, but it is perceived to be quite a costly way to collect and participation rates are quite low.</li> <li>- Larne: co-mingled blue bin, which results in higher participation rates but lower quality recycle.</li> </ul> <p><u>Food</u></p> <ul style="list-style-type: none"> <li>- Food waste is collected through co-mingled garden/food waste bins. A separate food collection scheme was piloted with 2,500 households since Sept 2016, but participation rates have been low (only 15%-20%), generating only c3 tonnes per week. This experience has led the council to decide that co-mingled collection is preferable, but that it needs to look at ways to divert food waste from the residual bin into the co-mingled bin.</li> </ul>	<p>The Council’s priorities in the development of its waste collection system are:</p> <ul style="list-style-type: none"> <li>- to increase levels of food waste recycling, by reducing the amount of food waste disposed into the residual bin and increasing the amount disposed into the garden/food waste bin.</li> <li>- to roll out kerbside sort collection methods for dry recyclables, so as to improve the quality of the recycle.</li> </ul> <p>Food waste is a priority, as it will have the most significant and direct impact on the volume recycling rates, whereas dry recyclables are a priority to improve the value recovery.</p> <p>The waste management division has presented plans to Council which it believes are necessary to future proof the Council’s waste collection system. It presented case studies from Conwy Council and Falkirk Council, to show the positive impact of a triple stack system and 3 weekly residual bin collections.</p>



Council	No. households and recycling rate	Current collection systems	Future plans and key considerations
<p><b>Mid and East Antrim (contd)</b></p>			<p>The proposal outlines a staged roll-out:</p> <ul style="list-style-type: none"> <li>- Food – in April 2017 introduce a system to increase disposal of food waste into the co-mingled garden and food waste bin, rather than the residual bin, and disallowing collection of residual bins with food waste.</li> <li>- Dry Recyclables: agree a harmonised system for collecting dry recyclates, to be introduced across the council area. Reviews will be conducted into the relative merits of a co-mingled blue bin system and a kerbside-sort triple stack system, with a view to rolling out the preferred approach across the region from April 2019.</li> </ul>
<p><b>Antrim and Newtownabbey</b></p>	<p>57,000 households (36,000 Newtownabbey; 21,000 Antrim)</p> <p>Recycling rate – 47%</p>	<p><u>Newtownabbey</u></p> <p>Dry Recyclate:</p> <ul style="list-style-type: none"> <li>- 16,000 households use a triple stack kerbside sort system and a smaller residual bin with weekly collections. The council has found that recycling rates have increased with this system, for both organic and dry recyclates.</li> <li>- 20,000 households use the Bryson Box.</li> </ul> <p>Food Waste:</p> <ul style="list-style-type: none"> <li>- collected co-mingled with garden waste.</li> </ul>	<p>The Council has a progressive long-term outlook in the development of its collection systems and wants to be ‘leading edge’ with the most environmentally and economically attractive collection.</p> <p>There is strong support across the Council.</p> <p>The next priorities in the development of the household waste collection system are:</p> <ul style="list-style-type: none"> <li>- To move all households in Newtownabbey to the triple stack system. The council is planning to have all households on a triple stack system</li> </ul>

Council	No. households and recycling rate	Antrim Current collection systems	by December 2018. Future plans and key considerations
Antrim and Newtownabbey (contd)		Dry Recyclates <ul style="list-style-type: none"> <li>- <u>co-mingled blue bin, which goes to the Bryson MRF for sorting.</u></li> </ul> Food Waste <ul style="list-style-type: none"> <li>- co-mingled with garden waste except in some rural areas where food is collected separately.</li> </ul>	<ul style="list-style-type: none"> <li>- To encourage more food waste to be disposed into the co-mingled bin rather than the residual bin, through a programme of education.</li> <li>- To increase levels of glass recycling in Antrim. Options under consideration are through more 'bring sites' or triple stack boxes.</li> </ul>
Armagh City, Banbridge and Craigavon	83,000 households Current recycling rate: 48%	Armagh City, Banbridge and Craigavon Borough Council ("ABC") currently uses a combination of a brown bin (co-mingled garden and food waste), kerbside food caddy, blue/green bin (dry recyclate), Bryson Box and black bin (residual waste) across the region.  The main approaches for collecting dry recyclables and food waste are: <ul style="list-style-type: none"> <li>- Armagh: 22,000 households; Bryson Box collected kerbside for dry recyclables; food waste collected separately by Bryson across 8000 households and brown bins collected by the council for 14,000 households.</li> <li>- Craigavon: 42,000 households with a co-mingled blue bin, co-mingled food and garden waste for 37,500 households and food caddy</li> </ul>	The Council is confident that it can meet its recycling targets with its current collection systems.  The main priorities for the Council when deciding on collection systems are: <ul style="list-style-type: none"> <li>- Meeting its volume recycling targets. Minimising the cost of collection, without compromising service and recycling weights.</li> <li>- Avoiding any negative feedback or reaction from ratepayers.</li> </ul> The next priority in the development of the council's collection system will focus on: increasing the amount of food waste, whilst also reducing the amount disposed in the residual waste bin.



Council	No. households and recycling rate	Current collection systems	Future plans and key considerations
<p><b>Armagh City, Banbridge and Craigavon (contd)</b></p>		<p>collection for 4,500 households.</p> <ul style="list-style-type: none"> <li>- Banbridge: 19,000 households with a co-mingled green bin with a caddy for collecting glass and brown bin for co-mingled garden and food waste.</li> </ul> <p>In the former Banbridge area, the green bin has a separate pod for collecting bottles/jars, which are bulked by the council and supplied to Glassdon.</p> <p>The council also supplies paper directly to Huhtamaki from civic recycling centres.</p>	
<p><b>Lisburn and Castlereagh</b></p>	<p>56,000 households</p> <p>Recycling rate – 42%</p>	<p>The current collection system incorporates:</p> <p><u>Dry Recyclates</u></p> <ul style="list-style-type: none"> <li>- <u>14,000 households (former Castlereagh area) use kerbside sort, with 800 on the triple stack system and 13,200 with two Bryson Boxes. Kerbside sort delivers a higher quality recycle.</u></li> <li>- <u>42,000 households use a co-mingled bin, collected by the in-house council fleet and delivered to the Bryson MRF. Contamination is typically at 10%-15%.</u></li> </ul>	<p>The primary considerations for Council when deciding on the development of its collection systems are:</p> <ul style="list-style-type: none"> <li>- Meeting the current weight based recycling and legislative targets.</li> <li>- Cost of collection.</li> <li>- Public acceptability.</li> <li>- Impact on in-house jobs and employment.</li> </ul> <p>At the time of the consultation, the immediate priorities for the council in the development of its collection system were considered to be:</p> <ul style="list-style-type: none"> <li>- increasing the volumes of food waste recycled.</li> </ul>

Council	No. households and recycling rate	Current collection systems	Future plans and key considerations
Lisburn and Castlereagh (contd)		<p><u>Food Waste</u> All households have a co-mingled bin for food and garden waste, collected fortnightly and going to in-vessel composting.</p> <p><u>Residual Waste</u> Households have a 240ltr residual bin collected fortnightly. This material is currently landfilled.</p> <p>The proposed arc21 EfW project could increase recycling rates by another 7 percentage points.</p>	<ul style="list-style-type: none"> <li>- increasing glass-recycling levels.</li> <li>- Delivering economic efficiencies.</li> </ul> <p>However, the Council will be looking closely to the recommendations of the WRAP GAP study to assess the merits of respective dry recycle collection systems. The co-mingled bins have the advantage of being familiar to householders. The Bryson Box delivers a high quality recycle, but is not as convenient as the trolley or wheelie bin. The Triple Stack system delivers higher quality recycle than a co-mingled bin and is more user friendly than the Bryson Box.</p>
Belfast City	<p>146,000 – 155,000 households</p> <p>Recycling Rate: 40%</p>	<p>A combination of different collection systems are used across the in Belfast City Council area, as different approaches have been trialled:</p> <p><u>3 bin system</u></p> <ul style="list-style-type: none"> <li>o c74,000 households have 3 bins (dry, garden/food, residual) and fortnightly collections.</li> <li>o c22,000 households have 3 bins and glass collections, with fortnightly collections</li> <li>o c1,200 households have 3 bins plus glass collections fortnightly, and have also been included in a trial of weekly separate food</li> </ul>	<p><u>Dry Recycles</u> The Council is considering a move to a triple-stack system across all households in the council area. If approved this would be a £10mn-£12mn transformation project. Allowing for public consultation and council approvals, roll-out would start in 2018/19 at the earliest – if central government funding was provided, it could be rolled out over a 2-3 year period.</p> <p><u>Food</u> The trial of separate food collections across 1200</p>



Council	No. households and recycling rate	Current collection systems	Future plans and key considerations
Belfast City (contd)		<p>collection.</p> <p><u>Kerbside sort system</u></p> <ul style="list-style-type: none"> <li>○ c55,000 households have 2 boxes, weekly collections and separate food waste collection.</li> <li>○ c3,000 households use the triple stack system, collected weekly, and separate food collection.</li> </ul> <p>As a result, the council has a good understanding of the pros and cons of different systems, and which approaches are better in terms of recycling rates and contamination levels.</p>	<p>households has shown that food-recycling levels increased as a result of separate collections.</p>

Section 4.3 provides a summary of the key findings.



## 4. The Opportunity for Supply Chain Collaboration

### 4.1 Strategic Context – Transition to a Circular Economy

4.1.1 The scoping study and objectives of the Collaborative Network should be considered within the context of:

- the overall tonnage of household waste arisings is increasing, as a result of a growing population and rising number of households;
- legislative and environmental pressures are such that there will be a continuing drive to reduce disposal to landfill and to increase recycling rates;
- it has been recognised that, to achieve a marked increase in recycling rates, will require a new approach to waste management and waste collection processes; and
- there is a general acceptance and priority that Northern Ireland needs to move towards a more circular economy, and that changing our approach to waste management will have a central role to play in this transition.

These factors all support the need to reconsider our approach to household waste collection, introducing waste management systems which will not only increase recycling rates but will also improve the quality of the recyclate collected – to ensure that the value potential of the waste resource can be fully realised.

4.1.2 The economic, environmental and social benefits of moving to a Circular Economy have been widely documented and accepted globally, with governments as diverse as China, Germany, Scotland, Denmark and South Korea adopting Circular Economy Programmes. Within the UK, London has developed a Circular Economy Route Map to 2036, Scotland has committed £70mn of funding for circular economy initiatives, Wales has increased its core funding for the circular economy by 40% and has made plans for significant investment in collection and treatment infrastructure.

In Northern Ireland, momentum has been building to ensure that the circular economy is firmly embedded in the next Programme for Government and government departments have been working together to identify what they can do to support the transition to a Circular Economy.

Local authority waste management has a central role to play in this transition, and so a *strategic 'Task and Finish' group*, with representatives of NILGA, DAERA and SIB,

was established to look at local authority waste management. The Task and Finish Group concluded that:

- It will be a challenge with current waste management practices to meet the 2020 recycling target. If the current approach to waste management is not changed, then the economic potential from a circular economy will not be realised, opportunities to develop new products from waste will be lost, the cost of waste management treatment will continue to increase and councils will be exposed to continuing risks from illegal waste activity.
- With the developing policy around the circular economy, it is likely that ambitious new targets will be set for continued reductions in landfill and increasing recycling rates.
- Councils will have a central role to play in maximising the opportunities presented by the circular economy, as custodians of resources that can be diverted from disposal and used as materials for higher value reprocessed products.
- From a waste management perspective, a number of barriers have been identified, namely around the volatility, suppressed value and quality of recyclate, limited segregation of waste streams, limited options for further reductions in residual waste within the current waste management systems and need for investment in waste management infrastructure. Potential solutions have been identified, a number of which align directly with the objectives of this collaborative network, namely:
  - building quality and value into recycling targets;
  - establishing networks/infrastructure for sharing knowledge within the sector, and working collaboratively to overcome the barriers;
  - Councils working collaboratively together and with industry to address the barriers; and
  - Improving recyclate quality standards.

4.1.3 The work of this collaborative network therefore has the potential to make a strong contribution to the movement to a circular economy. However, this will require a change to current waste management systems, connecting the needs of recyclate reprocessors in terms of the quality and quantity of household collected waste, with the needs of the local authorities, in putting in place collection systems which meet their waste and recycling targets and are acceptable to rate payers.

As detailed in Section 2 there is already a demand and need from reprocessors in Northern Ireland for higher quantities and quality of recyclate collected within Northern Ireland. The following sub-section (section 4.2) summarises the impact that an increased and higher quality local recyclate supply could have on the reprocessors and the potential economic added value of this reprocessing activity.

Section 3 outlines the current waste management systems employed by those councils involved in the Network, but highlights that some are also already actively considering new approaches which would lead to less fragmented systems, increased recycling rates and particularly for food waste, and a higher quality recyclate. However, it is also noted that, to encourage the introduction of systems designed to optimise the value of recyclate, the recycling targets against which the local authorities are measured should be redesigned to incorporate quality, carbon savings, and environmental as well as weight-based measures.

The ‘Task and Finish’ Group recommended that, to develop waste management systems which will effectively support a more circular economy approach, there needs to be collaboration between councils, reprocessors and the waste management supply chain.

Bryson Recycling’s position within the supply chain, and as a member of the Network, provides a valuable link between the local authorities who determine and procure recycling services and the reprocessors who receive the materials to recycle. Section 4.3 provides an overview of Bryson Recycling and refers to benchmark examples of good practice from Scotland and Wales.

Finally, section 4.4 summarises the collaborative opportunity assessed by this Scoping Study.

## 4.2 Reprocessors – Commercial and Economic Impact

4.2.1 Northern Ireland is fortunate to have three major reprocessors of glass, paper and plastic recyclates, operating across export markets and providing an opportunity to recover high levels of value from our three main dry household recyclate streams. They are each leading players in their respective markets; one is locally-owned and two are owned by European parent companies.

Each of these three reprocessors is a major player and contributor to their local regional economy and to Northern Ireland as a whole, as:

- significant employers;
- strong exporters;
- valued customers for a local supply chain; and
- committed investors.

An adequate and reliable supply of recyclate material is fundamental to each of their businesses, in terms of quality, volume and proximity of supply. In each case, there are compelling pressures to keep contamination in recyclate at a minimum and, if recyclate is not available locally at the required quality specification, reprocessors are having to import their recyclate rather than sourcing it locally. Importing recyclate adds costs to the reprocessors, making it more difficult to compete in export markets.

All of the reprocessors confirmed that, if more recyclate was available locally at the required quality, they would be in a much stronger position to implement expansion plans. These businesses have a strong track record of growth, expansion and investment. More recyclate supplied from within Northern Ireland would strengthen the businesses in terms of efficiencies and cost savings and reduce carbon impact. In addition to strengthening the businesses to drive expansion plans and job creation, it would also help to safeguard the 700+ jobs currently employed by the three reprocessors in the Network.

Each of the reprocessors have found that co-mingled collections currently result in levels of contamination that are unsustainable for their businesses, in contrast to recyclate that has been collected separately through kerb-side sort or separate 'bring' sites and Community Recycling Centres, which is capable of meeting their required quality specifications.

Recyclate that is collected using methods that do not deliver the quality levels required by these reprocessors, generally goes to lower value applications or, in some instances, disposal. This is a lost opportunity for the Northern Ireland economy, in terms of both the value recovered from our waste and supporting the growth and competitiveness of this valuable reprocessing sector.

#### 4.2.2 Glass

- There are strong drivers within Encirc to increase and maximise the level of recyclate glass used in the manufacturing process. However, contamination levels must be less than 1%.
- There is a general view amongst reprocessors and GRFs that glass that is collected using co-mingled collection systems is too highly contaminated. This glass tends to be channelled to lower value applications and export markets.
- The Republic of Ireland has recognised that, unless the quality of household glass collections can be improved, valuable resource is being exported and lost to the local economy. As a result, bye-laws have been passed by some local authorities requiring glass to be collected separately.

- In Northern Ireland, approximately 225,000 households have separate kerbside collection of glass. Whilst civic amenity and ‘bring’ sites capture c12,000 additional tonnes, a significant volume of glass waste arisings from households is still not being captured. Consequently, the Republic of Ireland has become a predominant supplier of glass cullet for local reprocessors.
- If more glass recyclate was available in Northern Ireland, from separated collection systems, Encirc could use this recyclate to continue to grow its business and increase the recyclate fraction within its products.

#### 4.2.3 Paper

- The two main issues for Huhtamaki Lurgan with regard to post-consumer paper supplies are: contamination levels and proximity of supply.
- As Huhtamaki’s products are used in the food and drink sector, contamination is a critical issue. Huhtamaki Lurgan’s experience has found that contamination levels are too high in current co-mingled collection systems, and kerb-side sort and separated collections via banks and Community Recycling Centres are by far the preferable option.
- Only half of Huhtamaki’s post-consumer paper supplies are from Northern Ireland and Huhtamaki will now only buy post-consumer materials that have been collected separately (either through kerb-side boxes or paper banks and Community Recycling Centres).
- Currently, c35% of post-consumer paper is being ‘lost’ and not recycled, and a large proportion of the paper that is collected is co-mingled and being exported to low-value markets.
- Getting adequate supplies of post-consumer material locally will be critical to the strength and sustainability of the future business.

#### 4.2.4 Plastic

- Cherry Plastics has found that the contamination levels in plastic recyclate from co-mingled collection systems and co-mingled MRFs are currently too high and result in unacceptable levels of rejects and costs to the business.
- The company is striving to significantly reduce its reject levels on recyclate, by moving away from co-mingled sources in favour of plastic that has been sourced through kerb-side sorted or separated collection.

- As a result, less than a half of Cherry Plastics' post-consumer plastic recyclates currently come from Northern Ireland, with most of the balance sourced from GB. The transportation costs on supplies from GB place a significant cost burden on the company, but are necessary to enable the company to source supplies of an adequate quality.
- Based on DAERA WasteDataflow figures, the capture rate for household plastics in Northern Ireland is very low (c16%), and so it would appear that there is still considerable volume of post-consumer plastics which is not yet making it into the recycling channel. Furthermore, many areas still use a co-mingled system for the collection of plastic recyclates.
- If more plastic recyclate was available from Northern Ireland, sourced through separated collection systems and Community Recycling Centres, Cherry Plastics could not only source a higher proportion of its supplies from Northern Ireland, rather than having to buy in product from GB, but would also increase its overall production and recyclate volumes, to support company growth plans within Northern Ireland.

#### 4.2.5 Food Waste

Household food waste is currently an under-recovered and under-exploited resource. Not only are the recycling capture rates low, but the food waste that is collected mainly goes for composting, which is a relatively low value outlet in comparison to anaerobic digestion.

If more food waste was collected and available for applications other than composting, it would help to support the realisation of the bioenergy potential within Northern Ireland, reduce the need for energy crops, reduce reliance on fossil fuels and increase renewable energy generation and have a net positive environmental impact.

AgriAD believes that there is potential in Northern Ireland for an AD project pipeline equating to up to 150,000 tonnes of feedstock per annum.

4.2.6 The following table estimates that the current economic added value of the 3 reprocessors included in the Network is at least £110mn, with a further £47mn of unrealised economic potential from the additional capacity that the reprocessors could release if additional recyclate was available locally. These estimates do not include the value that could also be derived from generating biogas from food waste.

Companies	Materials	Current			Potential	
		Employment	Tonnes Reprocessed	Estimated economic added value	Additional tonnage required – not currently available	Additional economic activity that could be generated
Encirc	Glass made into new glass bottles	441	100,000+	£76m	40,000+	£31m
Huhtamaki	Paper made into egg boxes and similar products	220	16,000	£26m	8,000	£13m
Cherry Pipes	Plastic HDPE and PP bottles made into industrial piping	65	8,000	£8m	3,000	£3
<b>Totals</b>		<b>726</b>		<b>£110m</b>		<b>£47m</b>

*(Added value has been calculated as the value of the reprocessors' end product less the cost of the recycle material per tonne, with a multiplier effect of 1.5 applied; Due to commercial sensitivity, the exact tonnage of cullet supplied to Encirc is not detailed in the above table. However, these figures were provided to Kappa Consulting and the added value has been based upon the exact figures)*

### 4.3 Recyclate Household Collection Systems

4.3.1 With regard to the collection of dry recyclables, a variety of approaches are used across and within the profiled council areas. This relatively fragmented approach is a result of trialling different systems and the amalgamation of different council areas with different legacy approaches.

To date the main considerations for councils in developing their collection systems have been:

- Meeting their recycling targets.  
Councils are currently given recycling targets based purely on the weight of material collected for recycling. These targets are not linked to the quality or value of the recyclate, carbon savings or the best environmental options. Whilst councils continue to be measured against a weight-based target, some may be reluctant to approve any change in approach that could risk (even temporarily) a dip in recycling volumes as householders adjust their recycling behaviour. Before considering a change to the collection system, they would need to be reassured that it would not impact negatively on their recycling rates. Indeed, it could be argued that, unless recycling targets are adjusted to incorporate measures related to quality and economic value as well as carbon and cost implications, they could become counter-productive to ensuring that the economic recovery value from recyclate is fully realised.

- The cost effectiveness of the system.  
There needs to be a clear business case and return on any investment proposed by the council, and also funds available for any major waste collection transformation programme.
- Acceptance and ease of use by ratepayers .  
Councils have to be sensitive to the acceptability of any changes to waste collection by its ratepayers. Again, council members will be reluctant to approve any changes which could be received negatively by their electorate. It is therefore important that any new system is user-friendly and convenient for the householder, and that they understand the rationale and benefits of the system.

Whilst none of the councils profiled currently have a single harmonised approach to dry recyclate collections, some are moving towards the introduction of a harmonised system, including a move towards kerbside sort, on the basis of quality and optimising the value recovered from waste.

WRAP has recently completed a 'Gap Study', commissioned by DAERA, which examines in detail the waste profile and collection systems for each local authority in Northern Ireland, and produced models to help the councils identify the preferred future-proofed approach for each of their council areas. At the time of writing, the detailed findings of the study were still being discussed with each of the councils and were not available for publication.

The study noted that the average recycling rate currently achieved from local authority household collections is 42%, with a target of 50% to be achieved by 2020. To meet the 2020 target, it was recommended that local authorities will have to change their current approaches to household collections.

A number of conceptual and modelling scenarios have been developed by WRAP, to help to identify the best collection option in terms of both cost and recycling efficiency. The local authorities have been waiting to review the information from WRAP, to help to inform their future development plans. It is understood that increasing the level of food waste going to the recycling is a priority, coupled with adjustments to the frequency of collection or receptacle capacity for residual waste. Scenarios including separate dry recyclate streams provide the potential for councils to reduce costs in conjunction with other changes to residual waste and food waste recycling collection.

- 4.3.2 Scotland and Wales provide strong examples of how waste management systems have successfully evolved to move towards a zero waste and circular economy approach.



### Scotland

Scotland has a well established zero waste and resource efficiency agenda, and a circular economy strategy with ambitious recycling targets – by 2025, 70% of waste should be recycled and no more than 5% of waste should be going to landfill.

The key challenge in the Circular Economy Strategy is to increase both the quantity and quality of materials recycled to support a more circular economy. Contamination is recognised as a barrier to high quality recycling.

Scotland has put in place a framework to support a more circular economy through its recycling systems. There are four key elements to this framework:

- ***Separate collection of key materials***, including food waste, and prohibiting separately collected material going to incineration or landfill;
- Development of a Scottish Household Recycling Charter, as a joint initiative between national and local government setting out a ***more consistent approach to household recycling collection*** systems, and a Code of Practice to increase householder recycling participation, improve the quality of recyclate and provide for greater economic benefits and savings for local authorities;
- A Scottish Materials Brokerage Service, to establish more commercially attractive collaborative contracts for waste and recyclable materials from local authorities, and to establish more certainty in the volume and quality of recyclate available for the domestic reprocessing sector; and
- A statutory Code of Practice for Materials Recovery Facilities, to improve the quality of materials arriving for sorting.

Reducing contamination arising from household collection systems is a key priority, to ensure that local authorities improve the quality and value of recyclate available for reprocessing – which is directly in line with the objectives of this collaborative network.

Falkirk Council is an example of a local authority which has led the way in changing its collection systems to improve the quality of its recycling. In 2013, Falkirk Council found that 60% of the material in their residual bins could have been recycled. With this evidence, the Council decided to significantly change its collection system and moved to a system comprising weekly separate food collections, fortnightly separate collection of dry recyclables, fortnightly collection of garden waste and the residual bin only collected every three weeks. Falkirk Council was the first local authority in the UK to move to three-weekly residual waste collections. The Council reports that its new collection system has resulted in increased recycling rates and reduced waste management costs.

Several local authorities around the UK have subsequently followed Falkirk's lead and Falkirk continues to lead the way, as the first council in Scotland to sign up to the Government's Household Recycling Charter. The Charter includes a three-stream recycling system, which will include one container for glass, one for paper and card, and one for metals and plastics, together with existing food waste and residual collections.

### Wales

By 2015/16, Wales already had a recycling rate of 60%– double the figure of a decade ago and exceeding the Welsh Government’s recycling target of 58%. The next target is to achieve a 64% recycling rate by 2020, 70% by 2025 and to become a zero waste nation by 2050.

Conwy County Council has been identified by a number of NI local authorities as a strong example of a council that has successfully introduced a new approach to collections, resulting in higher rates of quality recycling. Based on the results of the pilot, the Council decided to roll the system out across all 56,000 households within the council area over the course of late 2014/early 2015. Conwy Council has found that, with this new system, residual waste levels have dropped and dry recycling has increased. Conwy also reports that Trolibloc (3 boxes on a trolley – referred to elsewhere as either wheelie boxes or triple stacks) users tend to put out a fuller range of materials for recycling and has therefore, increased recycling in terms of both participation and the amount of material collected.

### 4.3.3 Bryson Recycling

#### **Company Background - Activities and Size**

Bryson Recycling is Northern Ireland’s leading provider of recycling services to councils in Northern Ireland and the largest social enterprise recycler in the UK.

Bryson has been delivering recycling services for over two decades. Its first recycling service began in 1993 with Cash for Cans where people were encouraged to recycle aluminium drinks cans for cash through the provision of accessible collection points at locations such as supermarkets. The service expanded in scale and the variety of recyclate handled.

During 2004 and 2005, after securing a number of local authority contracts, Bryson Recycling went through a substantial period of growth. The number of employees increased from 30 to over 200 in 12 months and the company relocated operations to Mallusk. The kerbside box service was introduced to 180,000 households in Northern Ireland and Bryson also built a regional Materials Recovery Facility (MRF) to process recyclables collected from a further 250,000 households in the Province.

Bryson Recycling is now the largest social enterprise recycler in the UK; collecting and processing materials from over 60% of homes in Northern Ireland, as well as operating 8 recycling centres across Donegal, Ireland and Conwy, Wales.

#### **Key Facts**

- Staff employed 220
- Turnover £12.5 m
- Collect / process c 50,000 tonnes in NI for recycling

<b>Role in the Supply Chain</b>
<p>Bryson Recycling provides recycling services under contract for Local Authorities in Northern Ireland. The two main areas of activity have been:</p> <ul style="list-style-type: none"> <li>• <b>Kerbside sort and collections:</b> During 2004/2005, Bryson Recycling won a number of significant local authority contracts, to provide recycling services to 180,000 households in Northern Ireland through the use of kerbside boxes to store materials for collection. Bryson Recycling collects the materials from the boxes using specialist vehicles where the recyclables are sorted at the kerbside into separate compartments on the vehicle.</li> <li>• <b>MRF:</b> During this time, Bryson also secured a regional contract with arc21 to run a Materials Recovery Facility (MRF) to sort comingled dry recyclables collected by local authorities using refuse collection vehicles (RCVs) from houses using wheelie bins to store the materials. In the comingled/MRF model the materials are mixed and sorted at the MRF into their various material types.</li> </ul> <p>Bryson’s position within the supply chain provides a link between the local authorities who determine and procure recycling services and the reprocessors who receive the materials to recycle, and therefore an insight into the needs and challenges faced by these different parts of the supply chain.</p>
<b>Challenges Faced</b>
<p>Based on its experience of these two different approaches, Bryson Recycling has found that the main challenges with each approach have been:</p> <ul style="list-style-type: none"> <li>- the quality of the recycle materials collected through co-mingled bin and from a MRF operation;</li> <li>- customer acceptance and practical challenges around the design of the kerbside boxes.</li> </ul>
<p><b><u>MRF operation: materials quality.</u></b></p> <p>Given its social enterprise aims, Bryson’s aim is to sell recycle materials locally to allow the local economy to benefit from the value of the recyclable materials.</p> <p>However, Bryson has found that one of the main issues of running the MRF is the challenge of consistently maintaining the material quality standards required by local higher value markets. As a result, Bryson has had to sell its relocate to lower grade and therefore lower value applications, outside Northern Ireland. For this reason Bryson took a strategic decision not to include glass in the list of acceptable materials delivered to their MRF.</p> <p>Bryson Recycling struggled from an early stage to reach UK newsprint mill paper standards and, for a lengthy period, had to opt for a mid-grade output, selling to a news mill in Norway with some sales to Huhtamaki in Northern Ireland. In 2015 the company stopped</p>

supplying this grade to Huhtamaki and eventually, in 2016, ended supplies to Norway as they were no longer able to meet the required quality specification of c3% contamination (as cardboard is considered as a contaminant for this paper grade).

Bryson Recycling now sells 100% of the recyclate paper from its MRF as a lower value mixed paper grade to China where it is recycled into cardboard. In this grade cardboard and paper can be mixed and contamination tolerances are slightly higher. This shift to mixed paper was driven by the changing mix of materials received at the MRF facility, as a result of:

- i. Changes in consumer patterns, resulting in less paper and more cardboard and plastics.
- ii. Local Authorities adding more materials to their comingled collections, including plastic pots tubs and trays and cartons (e.g. Tetra pak).

Bryson Recycling has also experienced an increase in contamination in the mix of materials delivered by Councils. Contamination levels have gradually risen in recent years from an average of around 6% to around 10% at present. Non-target materials include plastic film and a range of items which pose a risk to staff and equipment.

The combination of these factors has led to a more complex and difficult stream of materials to sort and, as a result, over its 12 years of operation, the percentage of materials from the MRF sold in the UK has fallen from approximately 85% to around 10%.

The following table summarises the primary geographic markets for each of the material streams leaving the MRF in 2005, 2010 and 2017.

#### End destinations for materials from the MRF 2005 – 2017

<b>Material</b>	<b>Approximate % of total (est.)</b>	<b>2005</b>	<b>2010</b>	<b>2017</b>
Paper	70%	UK	EU / UK	China
Cardboard	12%	China	China	China
Plastic	10%	UK	NI	NI
Aluminium	2%	UK	UK	UK
Steel	5%	NI / export	NI / export	NI / export
Cartons	1%	N/A	N/A	UK

The following table details the main geographic end markets for the materials collected through kerbside sort.

### End destinations for materials from Kerbside sort operation 2005 – 2017

In contrast Bryson reports that 80% of materials collected through the box system are reprocessed in Northern Ireland.

Material	% of total	2005	2010	2017
Paper	35%	GB	EU	NI
Glass	35%	NI	NI	NI
Cardboard	12%	China	China	China
Plastic	10%	UK	NI	NI
Aluminium	2%	GB	GB	GB
Steel	5%	NI / export	NI / export	NI / export
Textiles	0.5%	NI / export	NI / export	NI / export
Cartons	0.4%			GB
Hand tools	<0.1%	Africa	Africa	Africa
Batteries	<0.1%		GB	GB

Customer satisfaction with the service has been very high (>95%), but there have also been consistent suggestions from householders on how the service could improve, primarily around the design of the kerbside boxes. These suggestions included:

- Boxes that are less susceptible to windy conditions
- Hinged lids to prevent them going missing or breaking
- Portable containers on wheels
- Better containment of materials leading to fewer episodes of littering
- Greater capacity for storing materials

Based on these suggestions, Bryson has developed a new approach to collections, predicated on achieving consistently high levels of recycling, material quality and customer satisfaction - this led directly to the development of the Bryson model.

### **'The Bryson Model'**

In developing the 'Bryson Model', Bryson Recycling considered the feedback from householders, the needs of the local authority clients and best practise elsewhere, to try to develop a system that would:

- Improve containers and vehicles
- Achieve the highest volumes of recycling;
- Achieve highest quality recycling;
- Minimise tonnage going to landfill;
- Be widely acceptable to householders and the public;
- Optimise value for money;
- Incorporate improvements to the containers and vehicles; and
- Be scalable and adoptable across NI.

The first step was to improve the vehicles. In partnership with Offaly based vehicle specialists, Romaquip, Bryson helped to develop the Kerb-Sort collection vehicle that maintains material quality through compartmentalisation. The vehicle has been a major success across the United Kingdom with Romaquip becoming the dominant market provider for this type of recycling vehicle, with around 350 units sold to date. Bryson report that the benefits of the Kerb-Sort vehicle include the very efficient use of space and innovative design which has proven to completely change the efficiencies of kerbside recycling by allowing a wide range of materials, including glass and food, to be collected safely and efficiently and to a high quality standard.

In addition to improving the vehicles, Bryson Recycling also worked in partnership with a Hull-based company, Straight Plc, to design the new “Wheelie Box” container. The ‘Wheelie Box’ has been designed to address the suggestions made by householders for improvements, combining all the benefits of wheelie bins in terms of ease of use and durability, with the benefits of a box system being able to keep materials separate and to a high standard.

These two innovations have provided a platform to reinvigorate the kerbside sort model. They enable the following core materials to be collected at the same time on a weekly basis: food waste; paper; cardboard; plastic bottles, pots tubs and trays; glass; textiles; aluminium and steel food and drinks cans; aluminium foil; batteries and hand tools. A weekly collection service for these materials allows councils to reduce their residual collections to three weekly and reduce garden waste collections in the winter months.

From modelling various approaches to recycling, Bryson believes that the wheelie box model provides the best outcomes through overall cost reductions as well as better environmental and social results. This is achieved through the combination of weekly food and separated materials collections, the reduction of residual waste collection and disposal costs, lower sorting costs and better materials values.

The Bryson model



### **Progress of the model**

The Bryson model was adopted by the Welsh Government and encouraged as their blueprint through a Collaborative Change Programme. The model has also formed the basis of the Zero Waste Scotland Collections Charter and the Consistency Framework adopted by Defra in England.

The model has not yet been adopted fully in Northern Ireland, although the wheelie boxes have been utilised in Antrim and Newtownabbey, Belfast and Lisburn & Castlereagh Councils, showing very positive results.

Notably Antrim and Newtownabbey Council are rolling out the use of wheelie boxes and smaller residual wheelie bins across the former Newtownabbey part of the Council, with around 20,000 houses being serviced this way by mid June 2017. Results published by Wrap showed the impact from selected trial areas as having a 30% increase in recycling, significant upsurge in participation and a 20% reduction in residual waste.

Despite the reduction in residual wheelie bin size, customer feedback has been extremely positive, with over 40% of 4000 residents involved in the first phase of the rollout responding to a postal survey about the new service, and 94% of respondents stating they preferred the new arrangements.

Bryson expects that the results of the WRAP study commissioned by DAERA (as referred to in section 4.3.1) will be similar to those experienced in GB and that the weekly wheelie box/three weekly residual model will emerge as the preferred approach across Northern Ireland.

Bryson Recycling would like to see a recycling collection model “blueprint” adopted by DAERA and, in line with the Welsh approach, a Collaborative Change Programme to support the transition process for the Local Authorities, providing encouragement in the shape of economic and practical support.

Bryson believes that it has a key role to play in the adoption of this emerging approach to recycling and waste management and that there may be significant merit in establishing a social partnership approach to service delivery. This may for instance take the form of a Council owned arm’s length company that forms a joint venture or procures a social delivery partner to introduce the new services. This innovative approach is not without precedent in the UK and has the potential to find the balance between Council control, value for money, social objectives, collaborative working and supply chain logistics.

#### 4.4 Collaborative Opportunity - Conclusions

4.4.1 The overall objective of this Scoping Study was to assess the opportunity for a collaborative approach to improve the quality of local authority household collected recyclate and thereby support the development of the reprocessing sector and the development of a more circular economy.

It is concluded that ***there is a strong strategic, economic and environmental opportunity to improve the quality and quantity of recyclate collected from households within Northern Ireland, through new approaches to household waste collections:***

- There is a demand and need from the local reprocessing sector for more recyclate to be supplied from household collections in Northern Ireland. Indeed, the lack of more locally available recyclate is placing local reprocessors at a disadvantage in terms of costs, efficiencies and capacity to grow.
- However, the majority of the recyclate currently collected from households does not meet the quality standards required by reprocessors and is being exported to lower value markets outside Northern Ireland, meaning that some of the value inherent in the recyclate is lost to the Northern Ireland economy and the growth potential from our reprocessing sector is being inhibited.
- To achieve the quality standards at the volumes required will necessitate a change to the current household waste collection systems, so as to reduce contamination by the introduction of a separately collected approach to recycling, using containers such as wheelie boxes or similar container.
- Coupled with this need from the reprocessing sector, local authorities are facing targets to increase recycling rates and reduce the levels of residual waste, and it has been recognised that these pressures will also require a change to the waste management systems.
- Finally, government is recognising the importance of transitioning towards a more circular economy and that waste management has a key role to play in this evolution. As the circular economy becomes more and more embedded into the government policy, waste management and collection systems will have to be designed in a way to ensure that the value from recyclate is optimised within the local economy.

It is also concluded that, to put in place the necessary waste collection systems and ensure that the circular economy opportunity is fully realised, ***the waste***



**management supply chain will need to work collaboratively** to develop systems which are practical and workable for the various players in the supply chain. This collaboration could take the form of sharing information on respective needs, developing solutions through collaborative planning, discussion and collaborative contracting. There is potential for significant benefit from councils working collaboratively to help to develop consistent approaches to delivery and public communications, including economies of scale, collective access to supply chains and sales of recyclate. In addition, there is an important role for central government, in embedding quality and the principles of a circular economy within the targets, measures and policies set for the sector, such as recycling targets based upon the quality as well as the quantity of recyclate collected and gathering information to measure the onward journey and value recovered from recyclate collected within Northern Ireland.

Indeed, the collaboration and sharing of information that has already resulted from the Scoping Study exercise is already helping to progress this issue, with the information provided by the reprocessors and on the economic impact helping Councils develop their plans and helping to inform government on the economic opportunity.

By developing household collection systems which will improve the quality of recyclate to meet local reprocessor requirements and increase the volumes of recyclate, there is potential to:

- not only **protect jobs**, but also create an environment for **expansion and job creation** within the reprocessing sector.
- build **resilience** into the Northern Ireland economy, and support the transition to a **circular economy**.
- increase **recycling rates**, reduce waste disposal and deliver **carbon savings** for Northern Ireland.

4.4.2 In addition to assessing whether there was an economic opportunity for collaborative working, one of the objectives of the Scoping Study was to assess whether there was an opportunity for this collaborative network to continue into a formal collaborative network, applying to Invest Northern Ireland for further funding through its Collaborative Network Programme.

The focus of the current network is on local authority collected household waste and the opportunity for the local authority waste management supply chain to work more collaboratively to improve the quality of recyclate to meet the needs of the local reprocessing sector. Therefore the focus is on collaboration between local authorities, reprocessors and the recycling supply chain.

It is not proposed that the network should apply to Stage 2 of the Invest NI Collaborative Network Programme in its current format. Whilst there is a strategic opportunity to be addressed collaboratively, progress is already underway, assisted by the findings of the Scoping Study. Responsibility for development of the necessary waste management systems now sits with the local councils with support from central government.

A number of the councils involved in the Network are already developing plans for new more harmonised approaches to their waste collections, with priorities on increasing food recycling and the quality of dry recyclates. Reprocessors are reporting that, from their experience, kerbside sort collections have been the most effective at delivering the required quality standards. There are strong examples from Scotland and Wales in support of this approach, and Bryson Recycling has developed a model for kerbside sort which it believes has helped to shape the approaches adopted in these regions and meets the needs of both the reprocessors and the councils, in terms of quality, recycling rates and costs.

The Councils have a number of criteria to consider in developing their preferred options. The collaboration and findings from the scoping study is already helping to inform these decisions and there will undoubtedly be ongoing dialogue amongst the current Network members, to continue to address this strategic issue. However, it is considered that this specific project would not require a formal collaborative network

4.4.3 That said, the Scoping Study process has identified an opportunity for a ‘spin-off’ Collaborative Network to address the a broader strategic issue of recyclate supplies for the reprocessing sector in Northern Ireland.

It was clear from the Scoping Study exercise that securing reliable and sufficient supplies of recyclate at the required quality is a major strategic priority for reprocessors, and one which not only has a direct impact on the efficiencies and profitability of the businesses but is also a critical factor in any growth plans.

This Scoping Study considered just one of the channels to help to address this issue (albeit a major one), namely increasing the quality of recyclate collected from households in Northern Ireland. However, in addressing this issue, reprocessors may also consider:

- initiatives to increase supplies of recyclate from commercial and industrial sectors;
- initiatives to recover recyclate directly from householders, including in partnership with producers;
- process developments to improve the yield from recyclate;

- product developments to enable a wider range of recyclate materials to be used.


These potential programmes of work would be in addition to increasing the quality and volume of supplies from local authority collections.


The reprocessors believe that there would be clear benefit in working collaboratively to develop and progress such initiatives, thereby addressing a key strategic issue for the reprocessing sector and creating an environment conducive to growth - not only of the current reprocessors but also of the sector as a whole. Therefore, as a result of the Scoping Study, the reprocessors wish to consider and scope out the establishment of a Collaborative Network focused on:


- the development and growth of the reprocessing sector in Northern Ireland;
- by helping to overcome the restrictions on growth resulting from limited availability of recyclate from Northern Ireland at the required quality levels;
- through collaboratively progressing a combination of initiatives to address this issue, including internal process developments, product developments and development of the supply chain.


## APPENDIX 1: Reprocessor Recyclate Quality Specification Benchmarks

Section 3 details the aspirational medium term demand tonnages for recyclate tonnage (complying with a quality standard). This Appendix defines the current quality requirements for raw material acceptance and is largely based on the current acceptance criteria employed by the reprocessors.

Recyclate Stream	Contamination Limit	Comments:										
 <p data-bbox="199 987 405 1066">mixed glass bottles &amp; jars</p>	<p data-bbox="448 831 616 904">0.5% 3% moisture</p>	<p data-bbox="721 741 1541 994">Glass for re-melt: End Users want bottles and jars as whole as possible. The 0.5% contamination level is for non-glass material. For Limits for colour contamination are: &lt;2% (colour) in Clear Cullet; &lt;2% Clear &amp; &lt;10% Amber in Green Cullet; &lt;2% Clear &amp; &lt;10% Green in Amber Cullet; &lt;0.3% Clear, &lt;1% Green &amp; &lt;5% Amber in dark green/blue.</p> <p data-bbox="721 1025 1497 1099">The maximum Critical contamination levels are given in the following table (per tonne):</p> <table border="1" data-bbox="791 1111 1485 1301"> <tbody> <tr> <td data-bbox="791 1111 1302 1144">Organic matter Paper, wood, food</td> <td data-bbox="1302 1111 1485 1144">3000.0g</td> </tr> <tr> <td data-bbox="791 1144 1302 1178">Magnetic (ferrous) metals</td> <td data-bbox="1302 1144 1485 1178">3.0g</td> </tr> <tr> <td data-bbox="791 1178 1302 1211">Nonmagnetic (nonferrous) metals</td> <td data-bbox="1302 1178 1485 1211">15.0g</td> </tr> <tr> <td data-bbox="791 1211 1302 1245">Plastic, caps &amp; rings</td> <td data-bbox="1302 1211 1485 1245">500.0g</td> </tr> <tr> <td data-bbox="791 1245 1302 1301">Inorganic Ceramic, stone, porcelain pottery, china, pyrex, ovenware,</td> <td data-bbox="1302 1245 1485 1301">10.0g</td> </tr> </tbody> </table> <p data-bbox="721 1308 1549 1518">Unacceptable contaminants are: hazardous or toxic material, and laboratory glass, chemical containers, needles, syringes etc. Cullet that contains: general rubbish, foodstuffs, metal, organic material, paper and plastics will also be downgraded or rejected.</p>	Organic matter Paper, wood, food	3000.0g	Magnetic (ferrous) metals	3.0g	Nonmagnetic (nonferrous) metals	15.0g	Plastic, caps & rings	500.0g	Inorganic Ceramic, stone, porcelain pottery, china, pyrex, ovenware,	10.0g
Organic matter Paper, wood, food	3000.0g											
Magnetic (ferrous) metals	3.0g											
Nonmagnetic (nonferrous) metals	15.0g											
Plastic, caps & rings	500.0g											
Inorganic Ceramic, stone, porcelain pottery, china, pyrex, ovenware,	10.0g											

Recyclate Stream	Contamination Limit	Comments:
 <p>newspapers &amp; magazines</p>	0.5% to 1%	<p>News &amp; PAMs: The main EN 643 Code for this grade is 1.09.00. The mixture must contain a minimum of 30% of newspapers and a minimum of 30% magazines with the precise percentages of newspapers and magazines above 30% being determined by agreement with the receiving mill.</p> <p>EN 643 states a maximum level of 0.5% contamination limit for "non-paper components" (see definition above); and a maximum level of 1% for "non-paper components and other unwanted material combined" (see definition above).</p> <p>Additional criteria include a maximum moisture level tolerance of 10%</p>

Recyclate Stream	Contamination Limit	Comments:
 <p>plastic bottles</p>	0% to 6%	<p>Plastic Bottles: Traditionally this material is 'sold as seen'. In mixed plastic bottles, Re-Processors are looking for a minimum 35% to 38% clear PET, a minimum 25% to 38% Natural/Coloured HDPE, with a maximum of 18% other plastic bottles. They want zero contamination, but will accept 1% residual food waste on packaging by weight, and &lt; 6% PTT (of which &lt; 20% is black Trays).</p> <p>All contaminants must not exceed 6%, of which &lt; 1% can be Plastic Bags; &lt; 2% Steel Cans; &lt; 3% News &amp; PAMs; and &lt;5% Aluminium Cans. Food Waste must be &lt; 1% by Weight). If End Users have a PRF, then they may be able to cope with more contamination (e.g. up to 20% PTT).</p>

Recyclate Stream	Contamination Limit	Comments:
	<p>0.50%</p>	<p>Municipal source-separated food wastes going into Wet AD: 0% contamination level for sharps, glass, clinical waste, nappies hazardous/clinical waste as well as for hardcore, concrete, rocks, tiles, ceramics, stones etc. but have a maximum total contamination level of 0.5% covering materials such as paper, card, plastics (by weight), textiles and metals.</p> <p>Food waste should be collected and presented to the facility in an appropriate form as agreed with the facility e.g. bagged, debagged, and loose. The End Users want their raw material collected separately from all other recyclables.</p>

